New Orleans Medical

and

Surgical Journal

Vol. 80 AUGUST, 1927 No. 2

THE GENESIS AND DEVELOPMENT OF THE SCIENCE OF MEDICINE.*

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PRESIDENT'S ADDRESS.

Ladies, Gentlemen, and Fellow Members:

I hope our subject tonight will prove of interest to all present. Instead of treating it from a strictly medico-scientific viewpoint, I wish to treat it more from a theoretical and historical basis, putting in medical matters of interest during the course of development of the subject. You will therefore pardon me, if I seemingly go so far in the past, as the dawn of time when there was no other than God, and who spake light, matter, and life into being, for a generic point, from which I shall attempt to trace (genealogically speaking) the period of gestation, birth, growth, and development of the mental tree of the science of medicine.

Man in all ages has been fond of, and greatly interested in, delving into the dim vista of the past for the origin of all things. Nothing has created more interest in his mind than to trace his own origin, and he has even tried in his enthusiastic endeavors to go beyond the Mosaic statement of the creation of man, and lose himself in the maze of hypotheses and theories advanced by ambitious thinkers. For our purpose, instead of tracing medicine from the present, backward (as man traces his ancestry), I shall go back to the creation of the world, accepting fully and unreservedly the Mosaic account as laid down in Genesis as a starting point for my theme, and there find the organic and inorganic matter, from which in due time and order, sprang the tree of medicine.

The science of medicine and the religion of man are so inter-correlated by the very nature of things that I shall refer often to the religious element or phase of human life without fear of being misunderstood.

Like all trees, for our purpose, it must have its time of planting, its rooting, its period of growth, and a moderate degree of development, before fruiting or engrafting branches onto other stocks as independent professions, yet so closely allied, as to be interdependent, one upon the other.

In planning the creation, an Omniscient God foreknew that He would create man, that man would fall from his high, sinless estate, that manifold evils would be visited upon him and his posterity in consequence; therefore, it was necessary that material must be in store for his physical assistance, or else, his seed would vanish from the earth.

He therefore took of the elements of illimitable space, and formed the earth. Man, in the maturer years of his intellectual growth, grouped these elements into a basic science called Chemistry.

After the void, of which God speaks, had passed away; after the elements, compos-

*Read before the Mississippi State Medical Association, Jackson, May 10-12, 1927.

ing the earth, had taken their places at His command; after all the inconceivable number of atomic and molecular combinations had taken place, for the need and purpose of the future man; inorganic chemistry was complete and ready for his every need.

The next act in the drama of creation was when God caused the flora to burst forth from the rocks in all its gorgeous beauty; and lo! organic chemistry was formed and ready for the advent of man.

But, yet another step must be taken in the great plan of the Divine mind, before his advent in the world. The animal kingdom in all its forms and phases, all created things capable of living in the sea, on the land, and in the air, must be created and ready to serve Him. Then, and not until then, did man appear on the earth.

What a beautiful world it was; the solid earth, the elements of which it was composed, the plant life in all its grandeur and glory, the denizens of the deep, the animal life on its surface, and the birds of the air, all created and subject to His will.

But man, the last and best of God's creation, fashioned in His own image, endowed with all but divinity itself, monarch of all created things, must fall—fall from his high and sinless estate, and bring upon himself and his posterity the evils which his temptation and sin entailed upon the race.

Listening to the beguiling influence of the serpent, our Mother Eve disobeyed the direct law or word of God. She stretched forth her fair hand and plucked the fruit of the tree of knowledge of good and evil. She ate; its flavor appealed to her. No momentary harm came to her; so she gave to her companion, and he ate also.

The deed was done beyond recall; sin, in the form of disobedience, had entered the world; and, although death was not instantaneous (as a quick deadly poison acts), it came as inexorably as if momentarily visited.

God, in person, charged them with the act of disobedience; and to their credit they did not lie, but pleaded guilty to the charge. Pronouncng a curse upon them, He drove them forth from the garden, and placed a flaming barrier before the gate to prevent their return.

They were exposed to all the evils loosed by Satan, when they accepted his version of the word or law of God. As physical ailments of every description began to prey upon them, man (in his extremity, born of necessity and despair), began to think, and to reason thus: "God told us before the fall that all thngs created were under the dominion and command of man, and that all should serve Him. "Surely," he reasoned, "all was not evil, but there must also be good; so, let us seek the good, for, did not the tree bear a fruit that was both good and evil?

"Therefore, let us be up and doing, let us be observant. Do not the animals eat of the roots in the ground, of the barks of the trees, of the herbs, and of the grass of the field; and are they not healed? May we not do likewise, and be healed of our ailments and live?"

So man began to gather together materials, some from the bowels of the earth, some from plant and animal life, and some from the air, observing and selecting the good, rejecting the bad; by so doing he planted the seed from which sprang our tree of medicine.

Figuratively speaking, it sprang forth a tiny, slender blade of hope, or promise, slow of growth, struggling for life, buffeted by the winds of failure, dropping a withered leaf here and there, again a new twig or leaf, or a bit of knowledge of proven value, stored up in his now rapidly developing mind and memory; thus adding to the material growth of our mental tree.

It was a slow, tedious, and often disappointing process of the accumulation of ideas, and of the application of those

thoughts, suggestions, and observances, extending over a vast period of man's history before its growth and development began to assume that degree or volume of facts, which aided and added to its material advancement.

As the centuries passed, and as man's necessities increased, he applied himself more and more assiduously to the gathering of remedies, until before long, enough of proven value was gathered by him to add materially to its growth.

The slender trunk or body began to show itself, and to grow stronger, larger, and higher, the more able to support the increasing weight of its now budding branches.

As the tree had its origin in the mind and brain of man, it was incumbent upon him that he nurture and care for it, and keep it fertilized with the food of human endeavor or labor.

For God had said, "that by the sweat of his brow, he should eat bread" to sustain life; so, he must as surely work and delve with hand and brain to work out the mysteries of remedies to aid him in his fierce battle against disease and ultimate death. He must need dig in the earth and rocks; he must go to the sea; he must search among the many roots of herbs, and of the barks, and leaves of plants and trees. He must needs go to the elements of the air.

All nature must be searched in his dire need of remedies to meet the ever-increasing number of diseases, now claiming a victim here, and a loved one there.

Stimulated by his desire to live, and by his wish to be able to alleviate human pain and suffering in others, he gathered his material without giving much attention to the character, or to the value of it.

As good and evil both entered the world from man's disobedience, so, in his haste to find relief from the ever-increasing number of human ills, he accumulated much that was worthless, harmful, and deadly, along with the good, helpful, and curative.

So great had this mass of remedies become, that it now dawned on his mind that he must prune off the worthless, the evil, the deadly, and carefully separate them from those remedies that gave relief, that cured disease, that saved or prolonged life.

As all power was given to Adam to name all things on the earth (animate and inanimate), so man now gave names to the many ills to which human flesh fell heir. He also began to note that the symptoms, repeating themselves in certain diseased conditions occurring in others, helped in the nomenclature, or classification of disease. By noting and grouping the symptoms, man was wondrously able to diagnose the nature of the illness with which the individual had been seized, and thereby enabled to draw upon his storehouse of remedial agents for its relief or cure.

The naming of, and the classifying of the now multitude of illnesses, and the noting of the group of symptoms accompanying each disease, was no mean or easy task; but there were great brains and master minds among men, even in those early times, which not only accomplished this Herculean task, but also classified the many remedial agents, laboriously preparing each remedy. From carefully noting its action, they were enabled thereby to fix the dosage with an exactitude that was remarkable to a high degree.

Thus, we had on one side the great array of diseases, and on the other, the countless number of remedies, prepared, dosed, and ready to be taken, or administered when in need.

From this good hour, medicine might well be called a science, imperfect though it was (and even so yet), but builded upon a foundation so broad and deep, that its superstructure has continued to build through the ages, and will continue to safely build, through the millenniums of

years to come. Like all things human, many evils fixed themselves upon, and entered into the budding science, obstructing its progress, and causing failure, disappointment, and despair. But with a bravery born of necessity, the men of medicine fought and strove steadily forward and upward, overcoming slowly but surely, the insuperable barriers encompassing them.

Not satisfied with the many remedies for the healing of disease (because of the many failures to cure), man turned to the vagaries of the mind for cures, namely, the practice of magic, to soothsayers, sorcerers, witchery, incantations, charms, fetich worship, and other things too numerous to mention, which, when added to an already over-crowded armamentarium, created such a mystery around the practice of the profession of medicine that the people soon began to believe that a God must preside over disease, and that this Deity was able to visit diseases of his own choosing upon any one displeasing him. So man strove to appease his wrath by appealing to those who posed as a medium through whom the angry God might be appeased, and his sickness healed.

Little by little, there built up around the structure of medicine, and the men who practiced the true art, and those who practiced magic, a kind of reverence, which soon grew into a spiritual acceptance that a God of medicine also existed, and that through him all cures were effected. Hence, the ancient Greeks gave us, through their great Homer, the fabled Aesculapius, the reputed God or father of medicine.

Out of this pandemonium of good and evil, Aesculapius, aided by his mythical daughters, Hygiea, Panacea, and Iosa, were said to be able to triumph over the visitations of the God of disease to such an extent, that hundreds of temples throughout Greece and Rome were erected in their honor, and were patronized by multitudes of the sick and afflicted, seeking relief and cure of their ailments.

This condition continued from the time of Homer, a thousand years before Christ to about B. C. 450, when there appeared upon the earth one of the mightiest intellects that God ever gave to the race, in the person of Hippocrates, the great physician, styled "The Father of Medicine." He was born on the Island of Cos, and began practicing and teaching his chosen and beloved profession, early in life.

He also traveled on the mainland of Greece, dispensing his wonderful knowledge, whither-so-ever he went. His writings, which were early celebrated, became the nucleus of a collection of medical treatises, by a number of authors of different places and periods, which were long attributed to him, and still bear his name.

He has the distinction of having been the first to put aside the traditions of early ignorance and superstition, and to base the practice of medicine on the study of man and nature.

He maintained the universal religious view that diseases must be treated as subject to natural laws, and his observation on the natural history of disease, as presented in the living subject, show him to have been a master of clinical research.

His accounts of phenomena show great power of graphic description. In treating disease, he gave marked attention to diet and regimen, expecting nature to do the larger part.

He reflected in medicine the enlightenment of the great age in Greece, and raised medicine and those who practiced it, to a level of the high standard, occupied by the Grecian philosophers of his day.

Many followers sprang into active practice from the teaching of Hippocrates, and it may be truly said that from the labors of his one hundred and three years of life the superstructure of medicine began to throw its now wide spreading branches over the then known world.

It is not necessary to note the rapid forming of the science from the time of

this great man, except to observe that men of great power of mind arose in each succeeding generation in ever increasing number, so that research and application went hand in hand, giving vigor and energy to our tree of medicine, whose widening branches and friendly foliage gave promise of realizing the hopes and desires of mankind in obtaining some degree of relief and restoration of health from the multitude of diseased conditions to which the human body was heir.

Frequent mention is made of the physician and his work in Holy Writ. Seven times we find reference to the medical man, extending from Genesis to the books of the New Testament, and all tend to show the physician was held in high esteem.

At the time our Lord walked and worked among men he not only performed great and wonderful miracles of healing of the sick, but He always commanded man to do that which man could do, teaching him plainly to do all that his finite power of mind and body could perform, and to ask of Him to bless his feeble efforts, leaving Him to do that only which God can do, to complete the healing process.

He further taught the people to "honor the physician," thereby elevating the science or profession to a high plane of estimation among the people, and proving, by associating man with His work of divine healing, that He was willing to be a partner in the work, a ready consultant in time of need, and a reliable guide when the way is dark and filled with human despair.

This co-partnership is one of which we should always be eager to avail ourselves. We will ever find a ready response by the greatest of all Physicians and we should be glad to advertise to the world of men that we are not ashamed of the divine partnership.

Beginning with the Seventeenth Century of the Christian era the art or science of medicine grew to such proportions that certain branches, needing more support than the parent tree could longer give, like the Ban Yan tree of South America, dropped a supporting tendril or root to the broad, stable foundations of the mother science, which, taking root, soon grew into great trunks, giving independent existence to those branches, yet retaining their fixed places on either side the science (medical), adding strength, vigor, and knowledge of application of the laws of prevention, and of the remedies for the healing of the nations.

With this added strength, medicine, pharmacy, and dentistry moved steadily forward and upward with ever-increasing momentum, making giant strides with even pace, vieing with each other in friendly emulation as to which could do more for the relief and cure of needy man. This friendly, loving relation continues to this good day, and will continue to the end of time.

Although great progress was made, the way was retarded by being cluttered up by many false evils, or cults, preying upon the very vitals of the science itself, vampire-like, sucking its life blood, fastening itself with a death-like grip, until detached and hurled away by loving hands of great minds arising in the profession from time to time, pruning away the dead or decaying twigs or branches, exposing the frauds, defying its enemies, overcoming seeming unsurmountable obstacles, preparing the way for modern medicine.

While great men arose in all generations and did valuable service in the interest of suffering humanity, no accurate or reliable data was kept in the archives of the profession until the beginning of the Seventeenth Century, when medicine was systematized into its fundamental sections or branches.

The great masters of medicine of that age began to organize themselves into bands of instructors, each teaching his

particular section or branch, gathering a body of ambitious young men around them who were eager to learn all that was then known of the science of healing.

Thus, slowly but surely, was laid the foundation from which has grown our great colleges and universities of medical learning of today. And as education of the civilized nations increased, education along the lines of medicine also increased, so that the advance in all departments of medicine has been so great and so rapid, that it is referred to, today, as one of the outstanding marvels of the age.

Beginning in the Seventeenth Century with the names of men with whose labors we are familiar, we find standing out boldly from a host of others such great characters as John Hunter, Edward Jenner, Louis Pasteur, Lister, Billroth, Virchow, Koch, Ehrlich, Sims, Osler, Flint and Murphy, each a pathfinder in his sphere of activity. Through their labors, medicine has reached the glorious climax of altitude and breadth enjoyed by you today.

Building on the foundation work of these men of revered memory, we sit at the feet of living exponents of the art of healing, who have taken up the mantles of those who have gone before, and who, aided by the wonderful revealing power of the laboratories, and of the too numerous to mention remarkable inventions of our age, have been able to reach still greater heights of success in the prevention of disease, the mitigation of pain, and the saving of human life, until the world stands in amazement and wonder at those who, aided by the Divine Physician, perform these miracles of healing.

I feel that we are justified in throwing bouquets of flowers at the feet of those men while yet alive and active and acclaiming them as entitled to a place in the Hall of Fame of medicine when they too have passed to their reward.

I refer with pardonable pride to a few of our very own masterful contemporaries, as Kelly, Moynihan, Deaver, Mayo, Crile, Finney, Bloodgood, and our own beloved Matas.

A host of others could be named, all of whom are known by their great powers of intellect, doing marvels in their respective lines, and teaching thousands of others seeking to follow in their footsteps, and, if possible, to attain to greater heights than the illustrious characters named.

Year by year, new secrets are wrested from the various diseases by our indefatigable research workers, the pathology shown under high powered lenses, the etiology given and pictured in unmistakable portrayal of photographic art, so plain that all may see and understand.

Hygeia, or Hygiene has opened up the way of progress along the lines of prevention, and bids fair before long to free mankind of many of the most feared and fatal diseases by strict observance of the laws of sanitation and of immunity.

A host of intrepid research medical men are untiring in their efforts to discover, isolate, and describe the elusive etiological factor of other deadly maladies (over which we now possess no curative agent), and are holding out a human hope that success will crown their efforts.

The work of the modern surgeon occupies no mean place in the great battle against disease. By following carefully in the footsteps of the master operators and teachers of today, thousands of surgeons are able to secure results so brilliant, that they are almost unbelievable, and with pardonable pride they are marching on in full confidence that surgical skill will produce results in the near future which will make present-day results poor, by way of comparison.

In the meantime, pharmacy has kept pace with the medical workers, so that the great pharmaceutical laboratories of the

civilized nations, with an army of world renowned chemists, are producing wonderful medicinal remedies for the cure of the many maladies now escaping prevention.

Odontology, or dentistry, has kept pace with medicine and pharmacy, lending valuable assistance in its field of work—in the alleviation of pain, in preservation of or arrest of decay in teeth, in removal and replacement of those too far advanced to save; thereby preventing absorption of toxins into the blood stream, and rendering incalculable artificial aid to the process of digestion by the proper mastication and preparation of our foods.

The noble profession of the Nurse, which sprang into separate existence during the Crimean War, under the peerless leadership of Florence Nightingale, has added much to the succees of modern medicine, and will ever hold a conjugal relationship to the profession, which no court, scientific or civil, can ever divorce.

God bless the noble band of workers in every field of endeavor in the science of medicine. May their labors yield an abundant harvest, and when the workers of our day and generation shall have dropped from their places one by one, as the leaves of a tree in autumn, may they be filled by worthy workers of other generations, who "shall carry on," and shall reach yet greater heights and breadths, until the friendly foliage of the great tree of medicine shall cover the earth, and sin, which was followed by disease and death, shall be banished from the face of the earth as a result of their labor, and the Son of man, on His second coming, shall say, "Well done, thou good and faithful servant."

THE DIAGNOSIS OF CORONARY OCCLUSION.*

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NEW ORLEANS.

In May, 1921, I was summoned one morning by a colleague. He had heard moaning in the bath room and found his father-in-law, aged 62, lying there on the floor partly clothed. The patient was complaining of pain in the sternal region. The doctor could not feel his pulse at first. When I saw the patient within one-half hour he was lying on a bed in the adjoining room to which he had been carried. The pulse was soft, feeble and very irregular. The heart beat regularly, about 160 per minute; fetal rhythm. The respiration was Cheyne Stokes. The surface was cool and excessively moist. The tachycardia and Cheyne Stokes respiration continued until the next morning. Meanwhile he had been given morphin and digitalis. About one the next morning he had another violent precordial pain which again required one-half of a grain of morphin by hypodermic. Later that morning the heart and pulse were both regular—90 per minute—and the patient was very comfortable. The apex beat was a forcible thrust in the sixth intercostal space in the anterior axillary line. Still later in the day a rasping systolic mumur was heard over the precordium from the left sternal border to the apex. This murmur could not be heard the following day. The blood pressure on this third day was 104 systolic, 75 diastolic. At no time was there any edema of the lungs. The liver was felt two fingers' breadth below the costal margin. After the stormy twenty-four hours the progress was uneventful. There was never any return of the pain, the tachycardia nor the murmur. Gradually the apex beat and left limit of dullness receded toward the middle line. The heart rate was usually in the neighborhood of 70; there were constantly

*Read before the Orleans Parish Medical Society, March 28, 1927.

ectopic beats. We had at that time no heart station here but in July an electrocardiogram tracing was made at Clifton Springs Sanitarium and a negative T wave found in leads I and II. In referring the patient to Clifton Springs, I wrote "I have wondered whether the clinical picture of pain, tachycardia, arrhythmia, murmur and dilatation did not indicate that there had occurred a thrombosis of one of the coronary arteries and a consequent myocardial insult. If this injury occurred close under the epicardium, we might account for what was, I am sure, a pericardial friction sound." While at Clifton Springs he had several attacks of heart irregularity with a sense of weakness and consciousness of the heart. Upon his return to New Orleans in October he was doing very well except that the heart showed a decided enlargement both to the right and to the left. The action was regular and the rate only 72, lying. On December 26, 1921, while walking on the street, he felt that he had indigestion and went into a drug store to get something to relieve him. In a few minutes he was dead.

Dr. A., aged 53, while making a professional call, was seized with an attack of pain in the chest radiating down both arms. When I saw him, within fifteen minutes of the onset, he was lying on a couch in evident great agony. The face was flushed though the surface was cool and moist. The pulse was rapid. The blood pressure was over 200 systolic. It required a grain of morphine by hypodermic to relieve him. In a few hours the blood pressure fell to 140 systolic. Within the first forty-eight hours there was discovered a pericardial friction sound and a patch of crepitant rales in the left lung posteriorly. The heart had become irregular and the blood pressure had fallen to 110 systolic. The temperature rose to 101°. There was a distinct leucocytosis. This stormy period lasted about ten days. There was then a gradual and uneventful period of convalescence. The doctor was in bed one month. He gradually increased his activities so that after eight weeks he was beginning to go out a little though he had not resumed any professional work. In the midst of this period of well being, a little more than nine weeks after the first attack, he was taken suddenly with agonizing pains in the chest. He had been lying in bed, reading, and was just preparing to go to sleep when the attack began. I saw him within five minutes. He was on the edge of the bed, half-seated, half-standing, in an attitude of intense anguish. The surface was covered with a profuse perspiration. He was only partly oriented. I gave him a hypodermic of half a grain of morphin and subsequently gave three more injections of one-quarter grain each at intervals of fifteen minutes. By the time the pain was entirely relieved he was profoundly unconscious. The heart was rapid but not irregular. The blood pressure was about 140 systolic. The patient remained unconscious for five or six days. Meanwhile he developed a double Babinski and an exaggerated knee jerk on the right and it was noted that the right leg when lifted fell in a manner different from that of the left leg. By the end of the week a complete right sided hemiplegia was well estabished. The coma became merely a stupor and after a week the patient though apparently wide awake was entirely unresponsive to questions. This was followed by a period in which he was entirely disoriented. He began to talk, though with difficulty, and had trouble for a while in finding the word he wanted. Gradually he improved, gained control of his sphincters and became bright and interested. Finally, he was able to walk about with the aid of a crutch and some support. In general he presented the usual picture of a hemiplegic. Thirteen months from the time of the first attack, he succumbed to a third one. He had gone out riding in an automobile. His son noticed that the doctor did not seem to be well and asked whether he had pain. This he denied, saying that he was merely tired. He was, however, apparently so seriously ill that the ride was cut short

and he was carried in to the house of a friend. He still said that he had no pain but asked to be given a hypodermic of morphin, which was done. I reached him within ten minutes. When I arrived he was entirely unconscious, pulseless and covered with a profuse perspiration. Within a few minutes he died. Pulse tracings made by Dr. George R. Herrmann between the first and second attacks showed typical coronary T waves.

I have related these two cases to illustrate the now well recognized sequence of events following an occlusion of a coronary artery; pain, prostration, fall in blood pressure, fever, leucocytosis, pericarditis and in the second case embolism to the brain, (in other cases emboli have gone to the lungs, to other organs and to some of the peripheral arteries), arrhythmia and characteristic changes in the electrocardiographic tracings. The diagnosis of coronary disease is, of course, not a new one but the recognition that it was possible to survive for months or even years after an occlusion of a coronary has become general only in the past two decades. The first satisfactory account was published by two Russian physicians, Obratzow and Strachesko[1] in 1910. Since the paper of Herrick[2] in 1912, many contributions have been made to the American literature. As Christian[3] remarked: "Cardiac infarction, the result of coronary thrombosis, had been shown to me (as a student) in the postmortem room, but I can recall no reference to cardiac infarction or, as it is sometimes termed, coronary thrombosis, as a condition to be recognized during life." This was due in part, no doubt, to the influence of Cohnheim's teaching that coronary arteries are end arteries and that their occlusion must bring immediate death. In part too, the failure to recognize the condition intra vitam must be attributed to the confusion and controversy which still reign with regard to the pathogenesis and significance of angina pectoris and of cardiac pain in general. In the past generation there was a more or less general belief that the heart itself was devoid of "nerves endowed with the power of conscious sensation."[4] This led to a disregard of precordial pain of minor degree and a failure to evaluate all precordial pains. The work of Head, however, has served to teach us the significance of referred pain. On the other hand there was, and still is, a desire to attribute all precordial pain to angina pectoris and to explain the pathogenesis of the latter upon one basis; hence the numerous theories of coronary disease, coronary spasm, aortic disease, cramp of the heart muscle, etc. Upholders of the theory that all angina is due to coronary disease could point to the frequency with which coronary lesions are found postmortem in cases of angina pectoris but their opponents could well rejoin that angina pectoris has existed where no coronary disease was found and extensive coronary disease has been found where no angina pectoris had existed. Vaquez[4] divides angina into two classes—angina of effort and angina of decubitus and believes that the former is due to a sudden distention of the aorta while the latter is due to a sudden distention of the heart. MacKenzie holds that angina is due to the heart contracting when the supply of blood to the heart muscle is deficient: "There was found a definite class of hearts which gives rise to pain when the blood supply of the muscle is defective on account of obliteration or narrowing of the coronary artery or when the heart muscle is so damaged that it is unequal to the task of maintaining an efficient circulation, so that in its endeavor to do this it becomes exhausted and pain results."[5] Allbutt contends that angina is due to a "tension of quasi cutaneous investments (*i. e.*, the adventitia at the root of the aorta) * * * and that in the vast majority of cases of ordinary angina this tension is exerted upon the thoracic aorta whose ascending portion appears to be more exquisitely sensitive to tension than the rest."[6] Such a tension gives rise not only to the pain referred to the sternal and pre-

cordial regions and down the arms but brings about reflex inhibition of the heart and thus sudden death. But even Allbutt, after discussing with Hochhaus the latter's case of coronary thrombosis, yields that he "can no longer hold that the source of angina is exclusively aortic. * * * In these cases then, the intense anginiform pain appears to have been generated not by any extension of inflammation from the pericardium to the root of the aorta—vera causa as this is—but in the heart itself." The truth as to angina pectoris, as Vasquez has pointed out and Hamman[7] has again recently emphasized, is that it is not a disease but a syndrome. Because of the latter day proposal to relieve angina by cutting the reflex, it becomes all the more important to study this syndrome and to attempt to segregate those cases due to organic heart and coronary disease from those due to a functional cause (in the Allbutt sense). It is evident that such an operation can only be harmful where coronary disease and consequent myocardial damage are present. Such a differentiation is not always easy and the recognition of occlusions of small branches of the arteries may easily be overlooked. This is indicated by the following history:

A man of 42 was taken suddenly with a sharp knife-like pain in the precordium shortly after a very light evening meal on Jan. 31, 1927. He had just had a disagreeable controversy. The pain continued all night and all the next day but he did not seek medical advice for twenty-four hours. He then went to Touro Infirmary and was there examined by one of the residents who found nothing abnormal. While the patient declared that he had a pain and that it was exaggerated by any exertion, his suffering was not apparent to the onlooker. He went home but returned the next morning when he was referred to me. I met him casually in the hall and was not impressed by any need for an immediate examination, nor did the patient demur when I set the time later in the day for the consultation. When I examined him in the afternoon I too could find nothing wrong. After hearing the account of his controversy I was inclined to believe that the pain had no real organic basis. The patient was perfectly calm and spoke of his pain in almost casual fashion, yet he insisted that he had not slept for nearly forty-eight hours and that any exertion, even bending over, increased the pain. I sent him home to rest and to take some bromide. Later that evening when my associate, Dr. R. T. Liles, saw him the pain was so great that two-thirds of a grain of morphin had to be given. The blood pressure at that time was 150 systolic. It had been 130 systolic, 100 diastolic in the afternoon. The following morning, February 3rd, after a quiet night the blood pressure had fallen to 110 systolic, 70 diastolic. In the evening the heart rate was 84; no murmur, no irregularity. The temperature had risen to 100 2/5°. There was less pain but generalized discomfort. The leucocyte count was 10,000, with 77% polymorphonuclears. The leucocytosis rose to 12,000 on February 4th. The temperature ranged from 99½° to 101° on February 2nd, 3rd, 4th, 5th and 6th. It still rose as high as 100° on February 8th. February 4th he looked more toxic. The color of the face was dusky, pulse 72, blood pressure 104 systolic, 80 diastolic. No murmur, no irregularity. Lungs normal. Some precordial pain again at 6 p. m. On February 5th any little exertion still brought on the pain. At 8 a. m. no heart murmur was heard. At noon there was a very distinct leathery rub to be heard from the left border of the sternum to the left posterior axillary line. It was loudest in the nipple line. The blood pressure was 98 systolic, 66 diastolic. The murmur was no longer to be heard after 2 p. m. An electrocardiogram made on February 11th showed coronary T waves with inversion in leads II and III, Q. R. S. complex was notched in leads II and III. In spite of strong advice to the contrary the patient left the hospital on February 11th. At this time he was entirely free of pain and apparently in normal health.

One notes, therefore, how relatively mild an attack of coronary occlusion may be and how transitory and elusive the physical signs. When we put together, however, the clinical picture of precordial pain, falling blood pressure (from 150 down to 98) transitory pericardial friction sound, fever, leucocytosis, characteristic coronary T wave in the electrocardiogram, we can have no doubt of the diagnosis. This patient probably suffered the occlusion of a much smaller and less important coronary vessel than was the case in the first two instances related. We must remember that even extensive thrombosis of the coronary system is not incompatible with life. Gross[8] and others have shown the extensive anastomosis of the coronary arteries and fortunately these anastomoses increase with age so that provision is made for the nutrition of the myocardium when a vessel becomes occluded. Experimental work by Porter,[9] Miller and Mathews,[10] F. M. Smith,[11] Hamburger, Priest and Bettman[12] has shown that dogs survive ligation and occlusion of one or other of the coronary vessels. Thayer[13] has reported a case where the patient lived for three years in apparent good health after the coronary insult. Autopsy showed "apex of both ventricles and the lower part of the septum was replaced by a mass of cartilaginous scar tissue clearly the result of an old cardiac infarct with organized intraventricular thrombi." Osler[14] reported that he had seen a heart "showing almost complete obliteration of the left coronary, only a pin point channel could be traced a short distance; of the right coronary the main branch was obliterated so that only one of full size passed in the posterior interventricular groove." Paul D. White[15] has reported a series of thirty-two patients in whom the average duration of life after an attack of coronary thrombosis was fifteen and one-half months, ranging from a few hours to seven years. The average age of life after the attack in thirty-five other patients still living was twenty-four and one-half months. The average for the total series of sixty-two patients was twenty months and White expected that would be lengthened considerably when after an interval of years a final report will be made of the cases.

The difficulties of the diagnosis of cases of coronary thrombosis lie not only in differentiating these cases from the angina syndrome due to other causes and in the recognition of minor forms. Unfortunately, it is not always the precordial pains that dominate the picture. The pains may be abdominal and simulate those of intraabdominal disease such as perforated gastric or pyloric ulcer and particularly gall-bladder disease. The sudden deaths ascribed to "acute indigestion" are in reality due to coronary obstruction. One of our most esteemed colleagues died some years ago in his office in an attack which at first so simulated a gastric condition that an attempt was made to pass a stomach tube to empty the stomach. Within the past few weeks I witnessed the sufferings and end of a man who had attributed his distress to an indiscretion in eating as well as in alcohol. He had maintained a status anginosus for seventy-two hours or more and even toward the end still described his sensation as something like a bad heart burn. This was all the more strange because he had for several years suffered typical minor anginal pains in the chest and down the left arm brought on by exertion or emotion and terminating at once when he came to rest. Belching and gastric distress are frequent in anginal attacks and have been commented upon by every writer. Belching indeed, as MacKenzie points out, often brings relief and seems to terminate an attack. It is sometimes difficult to make a diagnosis between gall-bladder disease and repeated attacks of angina. Some of the latter, characterized by apparently minor gastric symptoms in my own experience, have in the end proved to be based upon coronary disease. Another colleague presented a picture that might have been mistaken for a myocardial affection secondary

to a chronic cholecystitis. He died of myocardial failure many months after the cessation of his painful attacks. His sallow complexion, slight jaundice and tenderness in the right hypochondrium might all have pointed to a mistaken diagnosis. A national figure, a member of Wilson's War Cabinet, was operated upon for gall-bladder disease and died suddenly in an angina during his convalescence from the operation. Faulkner, Marble and White[16] report three cases where this confusion of diagnosis arose. It is all the more puzzling to realize that both coronary disease and gall-bladder disease may exist in the same patient; to attribute to each disease the proper value in estimating the symptoms is a well nigh impossible task. From 1920 to 1926 I observed an old man—77 years old when I first knew him, nearly 83 at the time of his death. There was no doubt as to the nature of his angina attacks for more than four years. They came on after exertion, they ceased when he came to rest. They were not associated with any gastric symptoms. They were always relieved by amyl nitrite inhalation or by spirits of glonoin on the tongue. In the spring of 1926 he began to suffer pain in the right hypochondrium and ceased having the "heart attacks." He had no appetite and lost weight rapidly and finally became jaundiced. At times there were terrible agonizing pains at the ensiform cartilage. He grew weaker gradually and died after being in a stuporous state for a number of days. The autopsy showed a considerable pericarditis over the right auricle and an area of fibrosis on the anterior surface of the apical region. While no definite statement is made in the protocol as to the condition of the coronaries the above is evidence as to their involvement. The gall-bladder contained a stone measuring 2½ cm. x 1½ cm.

Levine and Trauter[17] report two cases of coronary thrombosis where the acute epigastric pain and tenderness, together with a leucocytosis of about 20,000 and a moderate fever made the diagnosis of acute inflammatory or perforative lesion of the upper abdomen seem probable. Autopsy revealed the true condition in each case.

Hardt[18] reports a case "where the history and clinical findings closely simulated a case of perforated peptic ulcer." The autopsy showed an obliterative pericarditis, extreme thinning of the left ventricular walls with a mural thrombus. The branch of the left coronary was partially obliterated by an old thrombus. The duodenum had an old healed ulcer. Besides this there was a small superficial acute gastric ulcer. Hardt reviews a large series of peptic ulcer cases showing chronic ulcerations. "Patients with this condition," he comments, "frequently have pains which radiate upward over the chest and occasionally down the arms and not infrequently are treated for a cardiac condition. In some cases, the symptoms are undistinguishable from those of angina pectoris."

I must not presume further upon your patience to enter upon longer discussions. I cannot, however, refrain from referring briefly to certain other aspects of the attacks of angina and coronary occlusion. The statement has been handed down from text book to text book that there is a characteristic attitude of the patient, a *sine qua non*, without which the dread diagnosis may not be considered. It is said that the patient in an attack of angina remains immobile and dreads to move; no one who moves about, certainly no one who threshes about and engages in vigorous movement may be regarded as the victim of impending disaster. Nothing could be more untrue. There is no characteristic attitude. I have seen cases—as that of another doctor and close friend—where the slightest motion, even the effort necessary to empty the bladder, brought on the pain. He lay, therefore, in his status anginosus absolutely immobile. On the other hand, another man found relief from the pain by a "rocking chair motion" by bending the trunk upon the thighs or by swaying the trunk from side to side. I recall another

patient who was exceedingly restless and excitable and twice got out of bed in spite of attempts of three or four people to restrain him. At the time he actually got out of bed and walked about the room he was practically pulseless. He nevertheless lived for seven hours longer.

Nor is the premonition of death always present, as one is led to believe by many of the texts. I have seen patients smiling and interested in spite of the pain. Such a one was the recent patient who described his pain as like heart burn. I do not think that he had any premonition of death. Neither he nor his by-standing relatives would have shared (had they known it at the moment) in my gloomy prognosis based chiefly upon the long duration of the attack (over seventy-two hours). Yet he lived seven hours longer, of which he was unconscious less than two hours. I have been struck too, as others have been, by the fact that dyspnea while sometimes great, may in other cases be slight or transient. Cheyne Stokes breathing I have often seen after coronary occlusion. The final phase in the case of a doctor was initiated by the terrifying experience of being awakened by the failure to breathe. Falling asleep again the patient would again be awakened by the apnea.

CONCLUSION.

Coronary occlusion must be regarded as a common occurrence. "As the profession becomes better acquainted with the characteristic features of the accident it will be a familiar clinical condition." I have in my records of thirty-six cases with the syndrome of angina. There are in fifteen of these cases adequate grounds for believing that a coronary occlusion had occured. Christian had seventy cases in his service at the Peter Bent Brigham Hospital in ten years. I have already referred to Paul White's series of sixty-two cases. There are in the literature a number of smaller series with autopsies.

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DISCUSSION.

Dr. J. H. Musser: Coronary occlusion is a subject in which I am specially interested. It happens that my father, my grandfather and my great-grandfather, all of whom were doctors, died of attacks of angina. My grandfather's death apparently was due to coronary thrombosis; at autopsy it was proved to be the cause of my father's death, and while I cannot tell about my great-grandfather, there is reason to believe that he also died of coronary occlusion. At one time there were ten Drs. Musser practicing medicine, and of the ten, five died suddenly from angina, so you can perhaps appreciate my rather personal interest in Dr. Lemann's paper.

I had a relative who had an attack about two years ago and remained quiet almost a year and who has been subsequently free from symptoms. The prolonged rest after an attack is a point

worthy of accentuation, because the tendency is for people, as soon afterwards as they possibly can, to be up and around.

There are one or two points of more than passing interest brought out by Dr. Lemann, one of which is the leucocytosis, an almost invariable finding in these conditions—fever and a high leucocyte count. It is one which should be pointed out as likely to confuse us in our diagnosis when there is the possibility of pain being referred elsewhere than the usual.

Another point, not generally conceded, is the frequency of coronary occlusion. Of course, we know that it is spoken of as a doctor's disease. Irrespective of that, it is much more frequent than we realize. W. W. Waite of El Paso organized a pathological society, got the doctors there interested in the subject of autopsies and made arrangements to assist associates who had autopsies. He also got the permission of the coroner to autopsy all cases of sudden death. In the course of two years in El Paso, which is a small community, he had very many, thirty-eight cases, I believe, of coronary obstruction, the majority of which brought about sudden death. The collection of hearts in his museum furnish very interesting specimens to anyone wishing to work up this subject. So we must not disregard this condition and believe it is rare. It is a disease which attacks most frequently those past the middle of life.

Another point I wish to emphasize, but which I cannot explain, is that previous attacks of angina seem to predispose to coronary thrombosis. I do not say that coronary obstruction is essentially a sequel of angina, but I do believe that individuals who have frequent attacks of angina eventually terminate their life by coronary obstruction.

Dr. S. Chaille Jamison: There are one or two points that I think it might be well to refer to. We have a general idea and on the whole it is true, that only the middle aged, or those past middle life, suffer from coronary thrombosis and angina and that sclerosis of the coronary vessels is always implied. Three or four years ago I reported a case of a boy of seventeen who died of coronary thrombosis. I believe that is one of the youngest cases ever reported in the literature. The patient was brought to the Mercy Hospital complaining of abdominal pain. Dr. Ficklen, the chief surgeon of the hospital, examined him, thought it was a pain of little moment and told him to go home. One night, a week later, he returned to the hospital complaining of excruciating epigastric pain, not radiating at all. I saw him and his general appearance revealed nothing of note. The pulse was rapid, the blood picture showed a leucocyte count of 20,000 and there was nausea and vomiting. Dr. Ficklen, who was called in consultation, looked him over and decided that his condition was so bad it was better to wait before attempting anything surgical as he would die on the table. I remarked that if he was not so young my diagnosis would be angina pectoris. The boy was not relieved by repeated medication and by morning he was dead. A good point in diagnosing these cases is that morphin has little effect in relieving pain. At autopsy an obstruction of the coronary vessels, practically complete, was found. There was no evidence of arteriosclerosis—he had a chronic appendicitis, nothing further. I think that case is worth keeping in mind.

Coronary thrombosis seems to be an extremely rare disease in the negro in spite of the fact that he is more prone to arteriosclerosis than any type of person with whom we come in contact. At autopsies, for three or four years, I have watched for this condition without success, even in cases of the most marked sclerosis, where the vessels were like pipe stems. Thrombosis is certainly exceedingly rare—to my knowledge there has been only one case found in the last few years.

Another point and a most important one, is the treatment of these cases—what is best for the patient? When we see a man with falling blood pressure it is natural to feel that cardiac stimulation is indicated and to give large doses of digalen or digitalis by hypodermic. My opinion is that digitalis is absolutely contra-indicated. Morphin we can give, but even when administered in large doses it has little effect.

A very interesting case that came under my observation is a friend of Dr. Hume, who referred him to me. At the time he was suffering with epigastric pain and I made a diagnosis of duodenal ulcer. At my request he was thoroughly studied on two different occasions with the roentgen ray, and fluoroscoped by two different men of experience and no ulcer was found. In the meantime he developed several attacks of agonizing pain radiating down both arms that Dr. Hume and I thought were angina. These passed off. Later, about two months ago, there was a recurrence of the pain in the epigastric region, intense, but no nausea or emesis. He was seen by Dr. Pratt, who made a diagnosis of ruptured duodenal ulcer, and immediately the patient was taken to the Presbyterian Hospital. Drs. Ficklen, Hume and I saw him and, as far as I could see, the picture presented at the hospital was not coronary thrombosis. Operation disclosed a duodenal ulcer perforating through the peritoneum. He says he has never felt better in his life than since the operation.

Now, I had to take back my diagnosis twice. I thought it was an ulcer and took it back, made a diagnosis of angina, and at operation it was proved to be an ulcer. I believe a man could have both, and although fond of this man, professionally, I hope when he comes to die the diagnosis will be thrombosis.

Dr. I. I. Lemann (closing): I am very much interested in Dr. Musser's suggestion that frequent attacks of angina may predispose to thrombosis. I look back on some of my cases and recall repeated attacks of angina before the final thrombosis, but in some of them it seems to me that I can also recall indications that they had preceding thrombosis, so I cannot say whether these attacks were at first angina terminating in thrombosis, or were repeated thrombosis causing angina. I remember, in this connection, a patient who gave a family history of angina; her mother and three or four brothers (one of them a doctor) died of angina. The pain she complained of was typical angina in type radiating down both arms. She called it neuralgia. For a long number of years she had what I am sure now was really thrombosis of the coronary arteries and finally she succumbed to heart failure. I can recall several doctors who had repeated attacks of apparent angina without thrombosis and finally died of coronary thrombosis.

The point brought out by Dr. Jamison is somewhat foreign to the topic of my paper namely: the treatment of coronary thrombosis. Regarding the use of digitalis in coronary thrombosis, I merely wish to call attention to the very wide and different views held by equally good men, equally quoted as authorities on the subject. Some on the one hand advocate its use, while others, equally competent, are strong opponents of digitalis therapy. It seems to me that sometimes good is derived from the use of digitalis in these cases. The first case I reported tonight had digitalis and at the time I was inclined to attribute his recovery to the digitalis.

How can we know this for certain? Our experience thus far has been, that digitalis or no digitalis a certain number are going to survive many months or years.

AMEBIC DISEASE.*

J. C. COLE, M. D.,

NEW ORLEANS.

Since the World War, we read more often reports of rare conditions, conditions formerly thought of as uncommon, and purely foreign, but today, as a result of their wide-spread prevalence, attracting our attention.

With the means of rapid transit we have attained, erstwhile foreign nations have become neighbors, and the world akin. This is of particular interest just at this time, when the entire Mississippi Valley, directly, and the South, indirectly, is suffering the direst calamity in the history of the Mississippi River.

Pestilence usually stalks in the wake of floods. We may expect an increase in those diseases acquired through contaminated food and water. Among these I wish to mention amebic disease. This infection is becoming very common, and while in its early stage it is easily controlled and effectively treated, in the chronic form, it is very difficult to control and more often ameliorated than cured.

It is not my purpose to enter into a detailed discussion of the many conditions and complications arising from the presence of the pathogenic ameba in the human organism, but rather to review with you some of the more interesting turns this protozoan organism takes in its journey from the mouth to the anus. Whenever the word ameba is used, I have in mind the endameba histolytica.

The endameba histolytica does not live apart from its host. Whether it is evacuated from the bowel, or drained from a liver abscess, or expectorated from an abscessed lung, or whence it may come, the ameba immediately loses its individuaity and becomes a harmless nothing. It is not possible to inoculate the human host or the laboratory animal by feeding them active vegetative ameba. The infection results from contact with carriers.

Just as it is generally accepted that a person can have tuberculosis without having tubercular disease, one may harbor cysts of ameba, and not show clinical

*Read before the Jefferson County Medical Society, Birmingham, Ala., June 6, 1927.

evidence of amebic disease. It is these apparently healthy carriers of amebic infection who demand our earnest study and concern.

It might be impressive to think of amebic disease as a filth disease, having been acquired through one of the angles of a triangle of "F"—flies, feces, food. Flies from contaminated feces light upon food stuffs, which are ingested, carrying the infectious cyst through the stomach, intact, into the small gut, where sporulation takes place and active, vegetative ameba result. These ameba are carried on into the big gut, the site of election, where the disease is established. The most favorable sites are the cecum, flexures and rectum.

The host is now actively infected with a tissue parasite. These parasites busily apply themselves to ingesting the intestinal mucous membrane, which together with the red cells, resulting from tissue destruction, form their source of food supply. Thus begins a war to the bitter end, between the ameba on the one hand and the host on the other. If the host is capable of repairing the destruction of tissue as rapidly as the ameba destroy it, the adjustment is a happy one to both man and ameba, since no active symptoms of disease result. But where the repair forces are unable to keep abreast of the destructive forces, and extensive areas of ulceration result, the ameba do not have an opportunity to encyst, but are forced into the lumen of the gut, and rapidly passed out in large numbers in the stools. Encystment does not take place within the tissue, but in the lumen. In their destructive process of the layers of the gut wall, capillary erosion results, thus opening up avenues of entrance into the vascular system. Having gained entrance to the radicals of the portal vein, they may find lodgement in the liver, which serves as a depot, from which the ameba are carried through the general circulation into various viscera,—the brain, the lung, the spleen, the bone marrows, etc.; a hepatitis may result, or a liver abscess, one of the most serious secondaries of amebic disease.

Going back to the original site of infection, usually in the dependent portion of the large intestine, with a predilection for the sigmoid, cecum and rectum. If the cecum is involved, vague symptoms of gastro-intestinal disturbance are noted, with tenderness in this region, associated with periodic diarrhea and constipation. The diagnosis of chronic appendicitis is frequently made, and not necessarily incorrectly. Cysts of endameba histolytica are usually demonstrated, and, it may be, an occasional vegetative ameba is found. This type of infection may continue as such, or the periodic diarrhea may give place to an active dysentery. I think it very important in getting a history from such cases that we stress particularly the difference between diarrhea and dysentery.

When the stools reach twenty, thirty or forty a day, containing blood and mucus, with abdominal cramps and tenesmus, it will be a simple matter to demonstrate active, vegetative ameba. The frequent desire to stool, with pain and bloody mucus, suggests that the lesions giving rise to these symptoms must be low in gut, and rectoscopic examination will disclose one or many crater-like ulcerated areas, situated from about one-half inch above the anal orifice upward.

With this introductory review, I would emphasize the ease and satisfaction with which vegetative and encysted ameba are demonstrated. At no time will a case of active amebic dysentery be unable to provide a specimen of material for study. Some clinicians resort to the proctoscope to secure material directly from the base of the ulcer. I prefer a specimen as passed by the patient, reserving the protoscope for making observation upon the progress of healing, under treatment. Cysts are rarely, if ever, found in the bloody mucus of an acute condition; they are found in constipated or formed stools. The specimen is

prepared in the usual way, when looking for ova or intestinal parasites, except that the washed specimen is mixed with Lugol's solution for the purpose of differentiating the nuclear bodies of other cysts. In the case of the histolytica, the nuclei number from one to four, in ameba coli, from four to eight. Repeated examinations, it may be over several days, are sometimes necessary to make a diagnosis. The demonstration of vegetative ameba is rarely possible in material removed from liver abscess and cysts are never found, as the ameba must leave the tissue and go into the lumen, before ripe cysts are thrown off.

We have to accept amebic disease as of more than passing interest. Liver abscesses are being encountered, and the carrier is known to be abroad. The carrier must be detected and treated; his intestinal tract must be sterilized, insofar as cysts of histolytica are concerned. Liver abscess, if not recognized and given the benefit of proper and early treatment, frequently precipitates fatal issue. Acute amebic dysentery incapacitates its victims, and unless controlled in its early stages, progresses into a state of chronicity, difficult to alleviate.

Unless one is familiar with the pathology of amebic disease he cannot appreciate the difficulties sometimes experienced, in getting a permanent cure through any one system of treatment. The line of attack must be directed toward ameba in the tissues and those in the lumen of the gut.

Upon making a diagnosis of active, acute amebic dysentery, the patient should be put to bed and kept upon an easily assimilable diet for at least two weeks.

Until recent years, ipecac, and its active principle, emetine hydrochloride, were recognized as the sheet anchor in the treatment of this condition. Because of the nauseating dose of ipecac required, I have abandoned its use. Emetine, stovarsol and yatren have proven almost magical in controlling the active symptoms of amebic infections.

Aside from knowing the curative properties of our remedies, I think we should be equally informed as to what harmful effects, if any, they may have upon our patients. Emetine hydrochloride is a very potent protoplasmic poison, and a careless, prolonged use of it will result in damage to the cells of the gut wall, to such an extent that ameba histolytica are able to reproduce in spite of its presence. This, I think, is the explanation of the so-called emetine fast state. Prolonged and indiscreet use of emetine will produce a profound muscular palsy, or weakness, simulating locomotor ataxia. Young and Tudhope, after animal experimentation, hold that one grain of emetine every twenty-four hours, not more than ten or twelve grains in all, is a safe dose.

Stovarsol, a synthetic arsenical, is contraindicated in those cases hypersensitive to arsenic. I have had just a few unpleasant situations arising from its use, yet not enough to discourage me in continuing it. Aside from its solubility, it has the advantage of being taken by mouth and producing no nausea or other disagreeable symptoms.

Yatren probably derives its amebicidal properties from the 28 per cent of iodin it carries. If used indiscreetly, abdominal cramps and frequent stools result. Turner and Jones have made some observations in the use of yatren, with most favorable results. It is given by mouth in doses of one gram three times a day.

With a known case of active dysentery, the following orders are written: To bed. Liquid or semi-solid diet, 0.5 grain emetin hydrochloride morning and evening, by hypodermic, for four days. Discontinue emetin, giving stovarsol, 0.25 gm., three times daily for seven days, watching carefully for any toxic symptom that may arise. A similar course of emetin for another four days. If no contraindications,

allow patient up, with return to normal diet, and stovarsol 0.25 gm. three times a day for another week, when treatment is discontinued for a like time. This method of every other week treatment is continued for six weeks from initial medication. If at any time acute symptoms return, resort to use of emetin as before. If there is no clinical evidence of disease after six weeks' treatment, in order to maintain the effect, give stovarsol 0.25 gm. every other day for two or three months. If periodic clinical, proctoscopic and stool examinations give no evidence of disease or cysts, the intervals between treatments are lengthened, but periodic courses of stovarsol or yatren are given for at least one year.

There are probably those who do not accept with me the theory that amebic hepatitis, which includes amebic liver abscess, is primarily a medical condition, and should be treated as outlined in the case of dysentery, with the possible exception of aspirating large quantities of amebic pus.

One should treat the healthy carrier in the same manner that the convalescent from the acute condition is treated.

Amebic disease is not purely tropical, but general and wide-spread.

There should be a routine and careful study of stools in all cases, but especially in those with a vague history of gastro-intestinal upset.

Prolonged treatment and periodic studies of all cases known to have had amebic disease are advisable.

The term amebic dysentery has dragged into disrepute the more dignified term amebic disease, since the true dysenteric case is probably in the minority.

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SEPTICEMIA.*†

ISIDORE COHN, M. D.,

NEW ORLEANS.

A patient who has been desperately sick recovers. The attending surgeon attempts to analyze the reason, he attributes the success to some remedy which he has administered. The satisfaction is great. Enthusiasm may lead to flights of imagination and rhetoric. If the enthusiast is prominent his mere announcement of another *cure* is sufficient to make many follow in his path.

In reviewing the literature of Septicemia it is interesting to find that this has recurred from time to time.

Every surgeon has been confronted at some time in his practice with cases of septicemia. The subject must therefore be of interest to all.

In the treatment of this disease we should be guided by *principles*, not statements; facts, not figures. We need to know more of the mechanism of defense and resistance of the body rather than reactions stimulated by various clinical procedures. When drugs are suggested for intravenous use we ought to know whether the results obtained are due to direct actions, or reactions. We should not accept the easier path, to follow the line of least resistance and accept statements made by seemingly well recognized authori-

*Read before the Orleans Parish Medical Society, March 28, 1927.

†Surgical Service, Touro Infirmary.

ties whom one would expect had exhausted experimental aspects of the problem before presenting the subject for clinical use.

John Gibbon recently has said "Improvement will come with the exercise of better surgical judgment and with the broader knowledge of general medicine."

There is no field which requires a greater exercise of judgment and which demands a more general knowledge than septicemia. Broader knowledge of this phase of medicine will make us realize that waves of enthusiasm have occurred and recurred; that many agents have been alternately lauded and condemned; that theories have been advanced and experimental proof of their validity presented, to be followed by contradiction of the theory and disproof of experimental evidence.

The last two or three decades have seen the revival of all forms of so-called chemotherapy. Enthusiasts claim many things for particular drugs. Time has buried many of these drugs in the volumes of libraries and newspaper files; and these are only referred to on occasions such as this when it is desirable to remind ourselves of the value of caution in the acceptance of so-called specific remedies. In all of the ages only a few specifics have been found.

It will be my purpose to attempt to recount some of the history of the successes and failures of the treatments advanced for septicemia during the past thirty-five years.

It is well to keep in mind the following questions:

What was the basis for deductions? Was it well laid plans based on experimental findings followed by clinical application, such as insulin in diabetes, or were the clinical results obtained in extreme cases which terminated favorably and on such findings experiments were conducted or hypotheses advanced to prove the rationale of the plan? Let us see.

A. F. Currier at a meeting of the Americaan Gynecological Association, 1893, advocated the use of inhalations of pure oxygen as a means of cure for septicemia.

The essay is a philosophic one based on the then accepted ideas. While we do not have to agree with the premises of this hypothesis we can appreciate the underlying thought which it conveys. *Give the patient a chance.* Maybe today we might do well, when we are tempted to do otherwise, to get a tank of oxygen or some other inocuous substance for the patient to inhale.

The following quotations from this paper should be of interest: "Fundamental to the consideration of this subject are the following facts: The blood is the vehicle by which *noxious* as well as *nutritious elements are carried to all parts of the body.* In Neelson's classification septicemia is defined as a condition of the blood in which poisonous effects are produced more or less rapidly and intensely by germs which it contains."

"These statements presuppose the fact that the normal blood of healthy animals does not tolerate pathogenic organisms; that when they are present it tries to get rid of them. *The process of phagocytosis is the chief means of disposing of them and effectng a cure, but when this process is defective for any cause, or when the vital forces of the body are feeble in their resistance or the pathogenic organisms especially active, the symptoms of septicemia are apparent. The present pathology of septicemia seems to rest upon foundations which are firm.*"

"The natural forces are to be sustained by the greatest possible abundance of the most concentrated food substance, especially milk, and by an abundance of alcohol. The object of this article is more particularly to direct attention to the availability and utility of oxygen as a means of treatment."

"The dark color of the blood, the small size and disorganized condition of many of the red globules in septicemia, and the shallowness of the respiration indicate a deficiency in the oxygen supply."

"That which is noticeable when chemically pure oxygen is inhaled at such a pressure as is compatible with existing conditions of respiration, is usually as follows: A stimulus to deeper respiration; warmth of the extremities, perhaps warmth of the entire body; increased tension of the pulse; a more natural color of the surface of the body, if it has been dark or very pale."

"The stimulation of the blood current and of the respiratory function is, of course, directly favorable to the purification of the blood by elimination of its toxic elements. The stimulation of the nerve centers presiding over functional activity, which is possible if intoxication is not too pronounced, is apparently the effect of the oxygen, and this, if sufficient and continuous, will produce a favorable result whether there is direct germicidal action upon the bacteria in the blood or not."

In 1903 Charles C. Barrows of New York suggested the use of formalin intravenously. In his paper he mentions some of the suggested remedies only to condemn them.

"The application of Crede ointment and the introduction of the silver salts under the skin hardly seems rational, and it would be as reasonable to attempt to take the fortress of Gibraltar with a popgun as to cure acute general septicemia by the ingestion of fresh brewer's yeast, although this has been recommended by a distinguished bacteriologist." (Barrows.)

Barrows believed that he could "*introduce into the general circulation some principle which would destroy bacteria or inhibit their development in the blood, and neutralize the toxins which they are supposed to produce.*" The cure in his first case was so spectacular that I quote it in detail:

"At a meeting of the New York Obstetrical Society, held on January 13, 1903, I reported the following case:

The patient, a negress, of slight frame, twenty-six years old and married, was admitted to ward 22, Bellevue Hospital, on December 25, 1902. She was in labor, and at the time of her admission was having a chill. Her temperature was 104.2 F., her pulse 124, and she was breathing at the rate of 30 a minute. There was a fetid bloody discharge from the vagina. She was delivered at six o'clock on the following morning of a macerated, decomposed, female fetus of about six months growth. After delivery of the secundines the patient was given an intra-uterine injection of a 1 to 10,000 solution of mercury bichloride. One hour after delivery, at 7 A. M., she had a severe chill accompanied by a rise of temperature from 99.4 at 3 A. M. to 105 at 7 A. M. At 2 P. M. the same afternoon her uterus was irrigated with hydrogen peroxide, followed by two quarts of normal saline solution. A considerable quantity of clots and shreds of tissue was obtained as a result of the douche. She was then transferred to the gynecological service, ward 23, where she was curetted on December 27th, and a large amount of decomposed membranes and placental tissue removed. She then showed signs and symptoms of pronounced general sepsis. On December 25th, the day of her admission, a microscopical examination of the blood was made, which showed the absence of malarial organisms, and a leucocytosis of 18,000. On December 30th, a blood culture was taken by Dr. Buxton in four flasks of bouillon, which gave a pure culture of streptococcus. At this time her urine showed albumin to a considerable extent, but no casts. *The patient was seen by the writer then for the first time. Her temperature was 108, her pulse 150 to 160, small and thready, and her respiration 38. She was in a low, muttering delirium. There were present absolutely no local signs or symptoms, and from all external appearances the patient was*

rapidly approaching death from a profound general sepsis. She was at once given an intravenous infusion of 500 cubic centimeters of a 1 to 5000 aqueous solution of formalin. In three hours her temperature had fallen to 105, and in six hours it had fallen to 101, her pulse being 104 and her respiration 28. For three hours the temperature remained at 101, when it gradually began to rise until it reached 103, her pulse having risen to 120. It remained at 103 for three hours when it plunged downward, until in three hours the thermometer registered by the rectum only 95. The pulse had fallen to 86, and the respiration to 22. In twelve hours the temperature had reached 102, and the pulse 110. It then dropped to normal, but rapidly rose to 103, although the pulse did not go higher than 112. Although a second blood *culture had been taken, there had not been time for a report, so it was decided to give her a second infusion, 750 cubic centimeters of the same solution being then given her. There was a slight chill without a further rise of temperature, which, in the course of twelve hours, fell to normal, where it has practically been since. The woman is now entirely well. Several blood cultures have been made, and none taken since the first infusion have shown any streptococci.* Frequent microscopical examinations of the blood have been made, and no morphological changes have been found in the red corpuscles. The albumin in the urine has cleared up, and no blood has appeared in this secretion."

William H. Park and W. A. Payne, according to Barrows, after experimental work, stated that formalin was not only useless but harmful.

Bauer (1903) says: "From the available facts it seems improbable that formaldehyde has a specific value in septicemia. The intravenous injections of antiseptics probably do not kill the bacteria in the blood in septic cases but does *dilute the toxins. Normal saline by the same route will do this equally well, and with less probability of injuring the delicate structures of the blood.*"

Hugh Young had reported in 1898 a case of septicemia *treated by blood letting and transfusion with salt solution.* He was enthusiastic over the wonderful therapeutic possibilities of saline infusions.

It is of interest to note that newspapers were reporting cures while experiments and direct available medical information contradicted the conclusions of Barrows with regard to the value of formaldehyde. History repeats itself. The case of Barrows was equally as spectacular as Young's cases in which mercurochrome has been used.

At this time (1903) Crede had already advocated intravenous use of silver salts. Harrison in 1904 wrote the following: "Intravenous injection of collargol has been proved by sufficient mass of *clinical material* furnished by observers such as Crede, Schmidt, Fehling, etc., to be the best therapeutical resource at our command in the treatment of septic infections." (Two grammes of 5 per cent solution of collargol was usually injected.)

During the great war Browning and his associates advocated acriflavin from which excellent results were obtained.

British observers also reported enthusiastically on Eusol.

Of all the therapeutic agents advocated as specific germicides in septicemia in recent years the two which have been championed by Hugh Young have caused the greatest amount of favorable and unfavorable consideration.

These reports of Young have certainly stimulated inquiry, experiment and thoughtful discussion. Young and his associates have published many papers. All are familiar with his general conclusions, but since his first successful case parallels the results obtained by Barrows with formaldehyde the case is here briefly summarized.

"The first clinical case (No. 1) in which the value of mercurochrome 220 soluble as an intravenous germicide was positively demonstrated was that of a man who came to me on December 30, 1922, complaining of pain in the kidney. Ureteral catheterization showed pus from both sides and infection with the B. coli communis. Following examination the patient developed a chill and fever. He was admitted to the hospital on *January 2, 1923,* with a temperature of 103.4 degrees, in a very toxic condition. On the following day the patient became irrational, temperature was high, and blood culture showed 140 colonies of B. coli to the cubic centimeter. The patient continued to grow worse, and on January 3 the temperature was 103 degrees. *He was irrational and medical consultants predicted that he would live only a few hours.* He was then given 34 cc. of a 1 per cent solution of mercurochrome. *He had a chill, high temperature,* with a drop within three to four hours to normal. Within twelve hours he awoke from his lethargy. He ate his breakfast the next morning. *Blood culture was sterile.* The urine promptly became free from infection and the patient was discharged seven days later perfectly well. *This patient, who had been treated in conjunction with Colston, gave us our first positive demonstration of the remarkable effects of intravenous therapy with mercurochrome.*"

"Conclusions: After a very painstaking study of our own cases, those which have been published in the literature and furnished us by doctors, and after the extensive laboratory study with animals we feel on absolutely sure ground when we state that our belief in the efficacy of intravenous injections of mercurochrome in combating both local and general infections—slight and grave, and our previous statements have been verified and justified."

There are several outstanding facts which should be noted in connection with Young's report.

Hill and Colston in a report on "The Effect of Intravenous Administration of Mercurochrome on the Bacteriostatic Action of Blood (1923)" state "It has been shown that *following intravenous administration of mercurochrome the bacteriostatic action of the blood* against B. coli is increased. This *increase appears to be greatest from 15 to 45 minutes after injection after which it rapidly disappears.*"

If this is to be interpreted literally the gun fire must inhibit sufficiently in 45 minutes to prevent further action by bacteria.

The report of Young *lays stress on the sterile blood culture. Experimental evidence proves that bacteria injected directly soon disappear from the blood stream without medication. The report shows that there is a definite and alarming reaction at times.*

It is admittedly a bacteriostatic agent, not bactericidal; even this action is evanescent. Sterile cultures on particular occasions following drug administration are not to be taken as reliable criteria of the effect of a drug. Can one look too lightly on the violent reactions? However, based on these reports, the use of the remedy was begun in an indiscriminate manner. The apparent good results have seeped into the literature. All of the failures and bad results have not been so fortunate.

Some have utilized the drug for the reasons given by Hinton: "The result obtained by Churchman relative to the selective action of certain dyes in inhibiting the growth of certain bacteria, *and the excellent reports from the clinic of Hugh Young regarding the therapeutic use of these dyes intravenously,* have interested us on the Eliason service at the University Hospital so much that we have tried them out in a number of cases."

"In a small series of cases no definite conclusions can be drawn, yet in noticing the marked decrease in wound exudates in four cases, and the clinical improvement in seven, in addition to the *fact that the in-*

jections seem to do no harm, it appears that a continued use of the dyes in ill and in the average case may in time increase its sphere of usefulness."

Hinton reports eleven cases. In two of these where the patient had hemolytic staphylococcus aureus infections, demonstrated in a blood culture, the patient died promptly in spite of gentian violet. In one a negative blood culture was obtained, but positive culture from the parotid gland; gentian violet was used, the patient recovered. In five cases where there were negative blood cultures, but gram positive organisms were obtained from pus discharging from the wound, recovery was attributed to the use of gentian violet.

Is it fair to give a favorable expression relative "to the use of gentian violet in cases of extreme septicemia" from such evidence? Will not the reasons given by this author, and many others, be challenged? Is the fact that this agent was used by Dr. Hugh Young sufficient warrant for its indiscriminate use? The pathology of septicemia and the action on various portions of the reticulo-endothelial system by drugs was not even seemingly considered.

Hugh Trout presented his observations on intravenous use of mercurochrome before the Southern Surgical Association at the same meeting as Hugh Young. He states that "There can be no question of the thoroughness with which this work was done, nor can anyone, knowing Dr. Young, doubt for one moment his sincerity, but, *we do have the right to question whether his enthusiasm has not allowed him to attribute to this dye beneficial effects which are, perhaps, not results, but merely coincidences.*"

"In virulent streptococcus infections, mercurochrome, whether given in massive doses or small repeated doses, had little or no effect in checking or altering the course of the infection, or in preventing its fatal termination."

"Finally, were you to ask me for my own personal view given briefly, I would state it about as fo'lows: 'Given a patient with a positive blood-stream infection, in whom all possible foci has been removed, mercurochrome is worth a trial, and, at least, *gives us one more thing to do in these otherwise hopeless cases, and such will often prove of some comfort to the family, even if not of benefit to the patient; but I do not believe all the claims made for it as a blood-stream sterilizer are as yet proven, and mercurochrome, like any other substance, should not be put in a vein unadvisedly or lightly.*"

The splendid painstaking report of Brill and Mayers is abstracted without comment:

"Mercurochrome and gentian violet, in freshly prepared solutions, were employed in doses of from 5 to 7 mg. per kilogram of body weight in three cases of septicemia and in two cases of local gonococcal infections. The results obtained are indicated in the following case reports:

Case 1. R. D., a man, was admitted February 20, 1924, complaining of headache, pain in the joints and fever. The present illness was of six weeks' duration, though the patient did not go to bed until a few days previous to admission, when the symptoms became decidedly worse. On the day of admission, the patient was found dull and listless, with a temperature of 100.5° F., pulse 88 and a blowing systolic murmur at the apex. The leukocyte count varied from 9,600 to 22,200, with a differential count from 86 to 93 per cent, neutrophils. After the isolation of streptococcus hemolyticus from the blood, mercurochrome was administered intravenously on three successive days. There was no improvement in the clinical condition and a blood culture taken after the mercurochrome therapy again yielded an abundant growth of the streptococcus. Death occurred several days after the last injection of mercurochrome, and the diagnosis was confirmed by a necropsy.

Case 2. J. U., a man, admitted June 12, 1924, complaining of chills, fever, sweats and generalized pain. A blood culture, taken June 16, yielded an abundant growth of B. coli-communior. After two intravenous injections of mercurochrome, a negative culture was obtained from the blood. However, since the patient still seemed critically ill and since the temperature

had begun to rise again, the mercurochrome therapy was resumed. Three more intravenous injections of 5 mg. per kilogram of body weight were given on three successive days. A blood culture taken on the day after the last injection of mercurochrome again yielded an abundant growth of the colon bacillus. Notwithstanding the positive culture, the patient's condition suddenly improved two days after the last injection, and complete recovery ensued."

"*A superficial examination of this record might lead one to attribute the recovery to the mercurochrome therapy.* A more careful examination, however, discloses the following facts: The general course of the temperature curve during the mercurochrome therapy is essentially like the temperature record during the three weeks preceding the onset of treatment; namely, alternating febrile and afebrile periods. Although a negative culture was obtained from the blood after the second intravenous injection of mercurochrome, it will be observed that after the fifth injection, the blood culture was again positive, yielding approximately as many colonies per cubic centimeter of blood as did the original culture before any treatment was instituted. It will also be seen that the negative culture was taken during an afebrile period. In view of these facts, it seems reasonable to conclude that the recovery in this case was independent of the mercurochrome therapy."

"*Spontaneous recovery in B. coli sepsis is not at all unusual.* Jacob reported thirty-nine cases, with 60 per cent recoveries. Coleman and Hastings observed three cases, in all of which the patients recovered. More recently, Felty and Keefer of the Johns Hopkins Clinic reported a series of twenty-five cases, in seventeen of which the patients recovered."

"Summary and Conclusions: *Clinical observations were made on three cases of bacteremia and two cases of local gonococcal infections treated by intravenous injections of mercurochrome and gentian violet. These observations, which were carefully controlled by cultural checks, seem to indicate that in these five cases the intravascular injection of the dyes in no way interfered with the progress of the infection.*"

"2. Experiments on the effect of dilutions of mercurochrome and of gentian violet on the growth of staphylococcus, streptococcus and B. coli in *vitro seem to indicate that there was no direct bactericidal action on those organisms from three hours' exposure to mercurochrome and gentian violet in concentrations of 1:10,000, representing the maximal advisable concentration of these dyes in the circulation.*"

Shelton Horsley, Jr., "doubts very much if these or other antiseptic dyes sterilize the blood stream."

"These dyes may decrease the activity and toxicity of certain bacteria or increase the immunity and defense powers of the body, or both."

"Doses of either of the dyes of less than 3 mg. are of little, if any, value; several doses at intervals are necessary to obtain the full therapeutic effect."

"The mode of action of these intravenous dyes is unexplained. Similar results followed the intramuscular injections of milk at repeated intervals of one or several days."

Sir Thomas Horder, British Medical Journal, 1925, says that "chemo-therapy has been very disappointing. The intravenous use of various germicidal agents seem not to have been very helpful in civilian practice."

Barker, in the International Clinics, 1925, expresses the hope that "in time we may discover antiseptic agents that will on single injection kill promptly all the pathogenic germs in the body in cases of staphylococcus infection." He mentions among agents which have been used mercurochrome and gentian violet. He thinks that they should be tried until we have sufficient experience to determine "what their therapeutic value is."

Churchman in the Annals of Surgery states that "it would be absurd to expect any effect on organisms floating in the blood stream from gentian violet injected into the circulation. Experiments prove conclusively that the bactericidal property of gentian violet circulating in the blood stream soon disappears."

Dean Lewis in 1926 summarized some important points. He states that "the behavior of bacteria in the blood stream is of considerable interest, for it has a definite relation to the clinical picture. Experimentally, when staphylococci are injected into the blood stream they have usually disappeared after 24 hours. During a general infection staphylococci may completely disappear from the blood to reappear when a suppurating focus ruptures in a vein or an infected thrombus softens and particles enter the blood stream. *Staphylococci apparently use the blood stream as a means to transport and not as culture medium.*"

We might ask what is this chemotherapy which we are trying to apply? What has been its successes and failures? What is the attitude of the students of this subject?

No greater living authority can be quoted than H. H. Dale. He says "chemotherapy may be defined as the specific treatment of infections by artificial remedies. The object of those who study it is to find new remedies which will cure or arrest diseases due to infection, not by alleviating the symptoms or invigorating the patient, but by directly and specifically suppressing the infection.

"The aim of chemotherapeutic investigation, therefore, must be to find toxic substances which, having a strong affinity for the protoplasm of the parasite and a weak affinity for that of the cells of the host, could be administered in sufficient doses to kill the infecting organisms and leave the host unscathed. The search must be for substances which are maximally 'parisitotropic' and minimally 'organotropic.'

"Ehrlich aptly compared them to magic bullets, constrained by a charm to fly straight to their specific objective, and to turn aside from anything else in their path."

"The knowledge yet available concerning the chemistry of the protoplasm has no point of contact with a conception of this kind. Such knowledge affords no suggestion as to the nature of the chemical differences between the protoplasm of the vertebrates and that of the unicellular parasite, and furnishes no basis for prediction, or even for surmise, with regard to their differential affinities for chemical substances of known constitution."

"The attempts to combat bacterial infections by means of artificial chemical substances have been fewer in number, and, on the whole less fruitful of practical results than those directed to infection with animal parasites. Bechhold and Ehrlich (1906-1907), prepared a large series of phenol derivatives, which far exceeded all previously known organic disinfectants in their lethal action on diphtheria bacilli growing in nutritive bouillon. The experiments were later extended to other bacilli and cocci. In therapeutic experiments none of these substances proved successful. The reason of their failure was more obvious when it was found that *their disinfecting potency was enormously reduced by the presence of protein in the medium.* Bechhold subsequently showed, by ultrafiltration, that the disinfectant had entered into combination with the proteins of the suspending medium, and had thus been prevented from reaching the bacteria."

Felton and Dougherty (1922) measured in a series of dyes, the toxicity for mice, the bactericidal action on staphylococcus aureus in whole blood, and the inhibitory effect on the phagocytosis of staphylococci by leucocytes in serum. In a large series of dyes *they found that the inhibitory action on leucocytes was exihibted in weaker dilutions than the bactericidal action. So far as these measurements can be*

taken to cover the factors at work in disinfection in vivo, they would be unfavorable to the efficacy of these substances under such condition."

With the work of Dale, Hobo and others as a background, Walton Martin asks the questions:

1. "If living pathogenic micro-organisms penetrate the blood stream, is the blood infected as the cellular tissue is infected in a spreading phlegmon?"

2. "Since the matrix is fluid in which the blood cells and the bacteria are floating, is an opportunity offered for the introduction of a chemical which will destroy the microbes and prove harmless to the living cells?"

"It has been shown by repeated experiments that if an inert substance, like lamp black, is introduced into the blood, it disappears in a short time. *The minute particles of the injected substance settle out from the blood where the circulation is unusually slow in the peculiar capillary meshwork of the spleen, the liver and the bone marrow.* There they come in contact with a special group of cells and are taken up by them. These cells belong to a group now spoken of as the reticulo-endothelial system and are distinguished not only by a pronounced capacity for phagocytosis but by their special reaction to certain vital stains."

"In experiments recorded in a paper by Hobo, the material used was fine India ink and the amount used from 2.5 to 3.0 cc. The particles were the same size or smaller than staphylococci and the solution was injected into the ear vein of rabbits. The animals were killed at periods varying from forty-five minutes to seventeen days after the injection. At autopsy the spleen, the bone marrow and the liver were found to be stained black. The other organs and tissues, the lungs, heart, brains, nervous tissue, gastro-intestinal tract and the kidneys were unstained. The microscopical examination showed, even in the early stages, particles of India ink in the star cells of Von Kupffer of the liver, the sinus endothelial cells and the pulp cells of the spleen and the endothelium of the capillaries of the bone marrow.

"There can be no question of this powerful reaction following the intravenous injection of certain chemicals; the chill, temperature, diarrhea, appearance of the patient; all suggest a violent disturbance. One cannot dismiss the evidence presented of rapid recovery. But how often does it occur; how much is due to the bactericidal action of the drug, how much is due to its toxic effect on the body cells? *It should be borne in mind that shortly after its introduction into the blood the chemical comes in contact with the cells of the reticulo-endothelial system, and almost certainly profoundly influences them.* May it not be that at times substances are liberated that are harmful to the bacteria? *Is not the action dependent on how much the drug stimulates or conserves the natural defense mechanism of the body?* At other times, may not some of the chemicals introduced produce various degenerative changes in the cells of the liver, the spleen and the kidneys."

"Dramatic reports of collections of heterogeneous clinical material is not convincing. Shall we speak, in coming years, of the sterilization of the blood or the poisoning of the body cells by the intravenous injection of certain of these chemicals? We have seen that contamination of the blood stream occurs under a variety of conditions. In many cases blood cultures show simply showers of bacteria; the absence of bacteria in the blood stream often indicates but examination between showers. Many so-called septicemias terminate with startling suddenness untreated."

"The point I wish to emphasize is that in the generalization of infection a very complex process is passing on in the body. The presence of microbes in the blood is but one phase or part of this process. To

speak of the blood as infected, in the sense that the cellular tissue is infected in a spreading phlegmon, is erroneous and misleading. To speak of the blood being sterilized by the intravenous injection of a chemical as a test tube containing a broth culture is disinfected, is equally misleading and erroneous."

It will be seen that Martin has emphasized the importance of the defense mechanism, the principle role of which is played by the reticulo-endothelial system. The importance of this system has only recently been considered before this body by Dr. Allen O. Whipple in the Chaillé Memorial address.

It will be sufficient to present briefly some of Aschoff's conclusions with regard to this system. "Phagocytosis is but one highy developed property of these cells, a circle of cells whose particular function it is physiologically as well as pathologically to devour degenerated white and red blood corpuscles and to metabolize them. The macrophage system acquired importance when Metchnikoff demonstrated its relationship to antibody formation in the development on immune bodies."

It would seem fair to state the following: Many attempts have been made to prove that cures in cases of septicemia have been due to the introduction of some chemical substance directly into the blood stream. This has been based on the belief that in vivo the action of the drug would be the same as in vitro. It seems to have been overlooked that the concentration is uncertain when the solution is put into the circulation. There is experimental proof that the maximal concentration advisable to introduce into the circulation has no bactericidal action. (See Brill and Mayer.) It is further known that the inhibitory action of various dyes on leukocytes was exhibited in weaker solution than possess bactericidal action. The presence of protein in media always reduces the activity of germicides. If the foregoing statements are correct, and we have reason to believe that they are, *we have little to expect in a direct curative way from intravenous chemical medication.*

The so-called specific action of the various dye stuff presupposes a selective bacteriotropic action and a negative organotropic action. This, Dale contends, we have no reason to believe exists.

Apparently the stimulating effect on the body cells by the drug injected has been overlooked.

There is experimental evidence to prove that bacteria disappear soon from the blood stream and settle in the spleen, liver, bone marrow, and lymph nodes.

Positive blood cultures signify only that the organisms are being transported by the blood stream. It does not signify that multiplication takes place in the blood stream.

Multiplication takes place in the foci where the organism settle out from the active circulation—in the reticulo-endothelial system.

Phagocytosis is the special function of the cells of this system.

Infection stimulates the defensive mechanism of these organs, which consists not only of phagocytosis but the elaboration of bactericidal substances.

It is a common experience that dye stuffs produce a violent reaction at times. Martin questions if this is not due to a disturbance of the defensive mechanism.

If the defensive mechanism is *essentially in the tissues of the reticulo-endothelial system why is it not better to stimulate this system by a known and comparatively harmless procedure, one which adds bactericidal properties without tissue destruction, by blood transfusion.*

Do everything possible to stimulate the native resources of the patient without introducing agents which may be potentially harmful.

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The following cases, W. K. and S., indicate that with proper supportive measures

and a watchful waiting policy the result will be as satisfactory as those obtained by dye stuff injections. It may take courage at times to resist these fashionable methods, but I believe that if one must resort to intravenous therapy a whole blood transfusion will be decidedly of more satisfaction to the patient. Time alone will answer the question.

Case 1. Master S., aged 5 years. The primary condition is supposed to have been a sty on the upper lid of the right eye. This abscess on the upper lid was incised by the attending physician. The swelling was associated with a marked febrile reaction, chills, and headaches. I saw this child the following day, June 9. The findings at that time were edema of the right lid, and several small discharging sinuses in and about the operative wounds of the upper lid. There was redness and swelling of the forehead, and edema of the right temporo-maxillary region. The temperature was 103.4. A diagnosis of orbital cellulitis was made. I suggested a blood culture and immediate operation, to be followed by use of hot compresses.

The blood culture revealed four colonies of staphylococcus per cc. of blood. At the operation we found all the tissues of the supra-orbital region greatly infected. Pus seemed to be exuding from the various layers of the scalp. A great amount of pus could be seen in the orbit. A gentian violet pack was introduced, and nothing further was done. Two days later there was less edema; the discharge was free. The child seemed greatly improved as he was playing about in bed. On June 13 he was given an anesthetic. There was free drainage from the upper lid and the skin over the nose. There was apparently no further spread on the right side of the forehead. There was some edema of the left side of forehead. Pus seemed to have accumulated in the left supra-orbital region, and across the bridge of the nose, therefore an incision for drainage had to be made. By June 22 there was marked improvement, with very much less pus present. The child's general condition was better. He left the hospital on July 8. At the present time, which is March 19, all wounds have healed entirely, the scars are pliable, and while there is some widening of the nose, and the scars on the forehead are prominent, the child suffers no disability. A plastic operation will be done at a later date.

Comment: Chemotherapy was urged upon us in this case. It was realized that as long as there were undrained areas the temperature would persist. It occurred to us that if we could provide sufficient nourishment and stimulation we might be able to avoid introduction of the depressing factor, which so often follows intravenous medication. It was argued that should we need intravenous therapy transfusion should be resorted to. You will note that it was not necessary.

Case 2. Master W. K., aged 9 years. Complaint: Fracture of the right leg, with multiple lacerations, the result of an automobile accident. When admitted it was the impression of the House Officer that an immediate amputation was necessary because of the great laceration of the skin and muscle, the condition of the bones of the leg, and the great rotation; the foot was completely rotated backward. There was very little skin covering the muscles of the leg from knee to ankle. Examination, however, revealed a dorsalis pedis pulse; the posterion pulse could not be palpated. In view of the palpable dorsalis pedis pulse it seemed desirable to make an effort to save the leg. Accordingly after giving him morphin, a small amount of ethylene was given, the wound debrided, and a Thomas splint applied. The color of the foot remained satisfactory at all times. The wound was Dakinized. He developed a marked febrile reaction associated with tachycardia. Blood cultures were repeatedly negative. The temperature was of a septic type. He developed a rash on his body which was difficult to differentiate from the ordinary exanthemata. Dr. DeBuys, in consultation, suggested that he had a septic endocarditis as the cause of the temperature. The temperature persisted, ranging from 100 to 103. The rash was recurrent in character. We resisted the urge to give this child chemo-therapy or even intramuscular injection of blood. We contended, as in the previous case, if anything should be indicated, transfusion would be more helpful than any other measure. It is true he is now walking on crutches. The entire area which had been denuded of skin has epithelized. His general condition is excellent. He is certainly as well as he would have been if any of the dye stuffs had been used.

Case 3. Mr. W. L., aged 33 years. Diagnosis: Furuncle of nose, cellulitis of face, streptococcal septicemia. Patient had had a coryza for several weeks, and his nose became inflamed. He was referred to a doctor who advised operation. Before having anything done patient consulted Dr. J. P. Leake, who kindly referred him to me. At the time of the examination there was a diffuse redness of the face, which resembled a

butterfly, particularly covering the bridge of the nose and both cheeks. This appearance, the patient stated, had been evident for the previous twenty-four hours. A smear was taken for culture from the furuncle of the nose. Streptococcus was reported by the Pathological Department. The temperature was 103. The total white cells were 12,250, of which 89 were neutrophils. Believing the condition to be one of streptococcus septicemia, he was given anti-streptococcus serum. When about 30 cc. had been administered patient became very pale, respiration slow, pulse became almost imperceptible. He had a few convulsive movements of the extremities. Morphin and atropin were given immediately. Respiration became more regular, the convulsive movements ceased, and the color improved. He was apprehensive that death was impending. The temperature in the next few hours dropped from 104 to 99 degrees. During the same afternoon the temperature rose to 103 degrees. Blood culture was reported negative at the end of twenty-four hours. The advisability of intravenous medication, with one of the number of dye stuffs, was considered, but it was decided not to give anything until a positive culture could be obtained. Gentian violet and mercurochrome solutions were kept on the table by his bedside. No harm was done with them in this way. Local applications of magnesium sulphate, lead and opium, and pure carbolic acid followed by alcohol applications, were used as conditions seemed to indicate each. The patient recovered and left the hospital on April 2.

Case 4. Mr. A. S. Diagnosis: Alveolar abscess, staphylococcal septicemia. Examination, December 21, 1926: Marked swelling of the left cheek, redness, heat, edema of upper and lower lid. Swelling of the mucous membrane of the cheeks. Patient unable to open mouth. Pus seemed to exude from cavity of left molar.

Operation, December 23, 1926: Incision was made along the body of the mandible, lifting up the masseter muscle with it. A large quantity of pus was evacuated. A pair of Ochsner forceps was introduced upwards in front of the parotid gland, and by using the point of the forceps as a guide, a small incision was made in the long axis of the body and through this incision the forceps were reintroduced, running up into the subtemporal fossa. Pus was evacuated from all of these locations. It seemed, however, that there was some pus under the sternomastoid, below the mastoid process. A large quantity of pus was evacuated from this region, but in doing this, a branch of the external jugular vein was injured. It was necessary, in order to control the bleeding, which was very free, to connect the incision over the body of the mandible to the posterior incision, along the anterior margin of the trapezius—thus making it necessary to cut across the upper portion of the sterno-mastoid with an irregular incision. The bleeding was controlled, and a dichloramin pack introduced into the depths. Penrose tubes were introduced.

Progress Notes, December 24, 1926: Since operation the temperature has been on a lower level, the maximum being 99.8 degrees. There is some edema of upper and lower lid on the left side, and some edema of the left cheek. There is some deviation of the mouth to the right side, suggesting the possibility of facial nerve paralysis.

December 25, 1926: Much less swelling of the face and less edema of lids. No increase in redness. Foul odor to mouth. The pulse volume is good. Patient has voided 37 ozs. in the last twenty-four hours. Transfusion of 460 ccs. of whole blood; donor, brother. No reaction during the giving. We next dressed his face. A large amount of pus was found when the pack was removed, at the left body of the mandible, and the tissues all exposed; they were found bathed in pus. All of the Penrose tubes were removed and the wound cleaned with peroxide. Iodoform gauze pack with compound tincture of benzoin was introduced in the large wound over the mandible. Penrose tubes were re-introduced in the sinuses and above the ears. Over the temporal bone we noticed that there was some fluctuation of the scalp. A pair of forceps was introduced through the upper wound in the anterior portion of the temporal fossa, and a large quantity of pus was evacuated. We then introduced the forceps under the skin of the scalp, and by using the end of the forceps as a guide, a small incision was made, and a large amount of pus was further evacuated. We then introduced a Penrose tube into the depths, and Epsom salt compresses were applied.

December 27, 1926: Since the transfusion the patient has had a chill, about an hour after the return from the operating room. The temperature has been much less—99 degrees at 4 p. m. Patient very much more comfortable. He does not appear toxic.

December 28, 1926, 3:15 P. M.: For the past few minutes the patient has been complaining of pain in the chest and difficulty in breathing. There are some signs of pulmonary edema. Pulse at present is fairly strong, but rapid. Morphin and atropin given by hypodermic. Tight binder applied to chest. There has been some fresh oozing from dressings and expectoration of clots of blood.

Comment: In spite of the free drainage, transfusion, and supportive treatment this patient succumbed to this rapid virulent infection.

Case 5. Master M., aged 11 years. Diagnosis: Axillary adenitis, suppurative. The child was admitted to the hospital with a mass in the axilla which was hard and tender, but apparently not fluctuating. The total white cells were 14,000, of which 78 were neutrophils. The temperature was 100. Blood culture showed positive staphylococcus aureus. Culture from the pus taken from the glands in the suppurating area showed the same organism. After free drainage of a large quantity of thick, creamy purulent material the temperature rapidly subsided, and he left the hospital, apparently well, April 21. No intravenous medication was given. Local drainage being all that was necessary.

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DISCUSSION.

Dr. J. D. Rives: We know that protozoan organisms live in the blood stream and produce infections of the blood itself, and that these true septicemias may be cured by chemicals without injury to the host. It is therefore, idle to state that it is impossible to destroy micro-organisms in the circulating blood. If we admit that bacteria can produce true septicemia we must admit that in time a drug may be found to cure the condition.

The real difficulty lies in the fact that the bacteremias with which we are familiar are not true infections of the blood, but manifestations of a very severe infection at one or more local foci, the organisms being fed to the circulation constantly or in showers. They are simply en route to their burial grounds in the liver, spleen, bone marrow, etc., and will promptly disappear from the blood stream if all local foci are chemicaled. Our failures to cure bacteremias by eradication of known local foci simply indicate that other foci exist undiscovered. They may be in the liver, spleen, or bone marrow, where the natural destructive powers have been overcome. I am unable to find any evidence that has ever conclusively proven the existence of a septicemia of bacterial origin without a local infection. If this view is correct, then the administration of chemicals intravenously for the purpose of killing these bacteria is fruitless, for a new army will promptly invade the blood stream as soon as the drug is eliminated. The bacteremia, being merely a symptom of the disease, recurrence will necessarily take place unless the local lesion is taken care of.

This method of treatment is being popularized in the profession by means of testimonials, strongly reminiscent of certain celebrated cancer remedies. These documents are very easy to get and are often misleading for the reason that they take no account of failures. Single widely

scattered cases of recovery may be found to prove the value of almost any remedy. They have no place in a scientific discussion. I have seen miraculous recoveries from septicemia both with and without intravenous medication, and the most miraculous one occurred weeks after mercurochrome had been tried without success. The "cure" took place following a violent crisis such as mercurochrome produces, and for no reason that I have ever been able to discover.

Dr. E. L. King: Septicemia is a topic in which I am intensely interested, because we have it almost constantly in our wards at Charity Hospital—not that it originates in our service, but so many infected patients are admitted from the outside.

In combating septicemia, as Dr. Gage says, one of our most useful methods is blood transfusion. We have been following the technique of Polak, giving small, repeated transfusions, 250 to 300 c.c. twice a week rather than one or two large transfusions. Polak's idea seems to be that the transfusion is primarily to stimulate the blood forming system; a certain amount of stimulation is derived from one transfusion; this is followed by a relapse, but another brings it up again and the process is repeated until the desired result is obtained. This is illustrated by the total and differential count before and after transfusion. In most instances we use the citrated blood. At Charity Hospital it is unfortunately difficult to get donors; the relatives themselves are very slow to act as donors, but when we get one or two and transfuse from them we feel that we have accomplished results.

It has been our experience that our diagnosis is clinical rather than bacteriological. In many cases of septicemia, presenting a typical picture at the time of admission, the laboratory test fails to reveal bacteria in the blood. I think that in these cases the bacteria are transient, appearing in the blood stream intermittently, and I believe that in most cases of septicemia there is thrombosis of the pelvic veins, with subsequent crumbling of the thrombus, and when this takes place bacteria are fed into the blood stream. If we are fortunate enough to get a specimen of the blood for examination at these times, the organism causing the infection can be demonstrated.

We have tried mercurochrome in some of our cases. Our first experiment was disappointing, a severe reaction followed its use and it took the patient a week to get back to her former poor condition—she got back to that point and finally died. We have used it in a good many other cases, but in one instance only, felt that we accomplished any good, a case of staphylococcal septicemia. At the time of the intravenous administration of mercurochrome her temperature was 106°; the next day she was decidedly better and a few days later the mercurochrome was repeated. Ultimately she recovered.

Of course, no conclusion can be arrived at because one case is seemingly benefitted, especially when so many others showed no results. I have a case in the ward at the present time who has been given two intravenous injections of mercurochrome, one blood transfusion, an intravenous drip, etc., with only transitory benefit. My prognosis this morning was that she would hardly live through the day.

Dr. O. C. Cassegrain: Septicemia is a very important and most interesting subject, but it is a good thing indeed, for the surgeon, that it is not as common as it might be for it is really a terrific disease and one very unsatisfactory to handle.

The best way to treat septicemia is to prevent its occurrence and while this may seem paradoxical it is nevertheless essentially true. Except in the fulminating types which fortunately are in the great minority septicemia occurs only in infections of some duration and only when resistance has been lowered to a minimum.

The problem, therefore, in all cases of severe infections, is not only to maintain body strength at all costs, but also to combat by all known measures the particular organism responsible for the infection. This brings out a very important point, namely; the necessity of making smears and cultures from all our infected cases. This, unfortunately is often neglected.

Surgical septicemia is usually staphylococcal or streptococcal. If it is true that it depends on lowered resistance, we may not infrequently successfully combat the infection, neutralizing the toxins before they have been able to do too great damage to the body, by the administration of specific sera. This is quite feasible in streptococcal infections, in fact it has been our custom for some time past, when dealing with infections severe enough to give general constitutional symptoms and which by smear culture of the pus showed the streptococcus to be the offending agent, immediately to give the patient antitoxin. We have not yet had cause to regret this measure. Unfortunately, at the present time, we have no serum for the staphylococcus.

I believe with Dr. Cohn that the use of dyes is unsatisfactory. I remember when Dr. Clark came back from a trip east a few years ago, how enthusiastically he spoke of the work Hopkins' men were doing with these dyes. I was impressed and used it in a few cases. But my

experience both with mercurochrome and gentian violet has been extremely unsatisfactory.

Dr. A. E. Fossier: I cannot resist the temptation of bringing to your attention a drug for which I am really grateful, because I feel certain it was the means of saving the life of a person very dear to me. I speak of tin and its salts. While it is used very little in this country, it has been extensively employed in Europe, especially by the French, from whom we have received glowing reports of the results obtained from its application. Recently it was noticed that workers in tin mines had acquired an immunity from staphylococcal infections, and that clinically it had a specific action on the staphylococci.

Its value has been proven to me in a case of staphylococcal septicemia and whilst of course, one case does not prove definitely the value of a drug, yet one case backed by many other reports in which the results obtained from it are equally good, certainly encourages the use of a remedy for which so much is claimed. I have used it in many minor staphylococcal infections with wonderful results. It can be procured under the name of "Ebanzyl" or Stanoxyl.

Dr. A. Jacobs: Just a word of caution concerning blood transfusions. This type of patient has a weak myocardium that cannot take care of a big load at one time, therefore small repeated doses 200-250 c.c. would be safer and of more value.

Not long ago I transfused, with 500 c.c. whole blood, a patient who had a severe secondary anemia. His pulse stopped and for a minute I thought he was dead. I attributed the accident, which fortunately did not prove fatal, to overloading the heart resulting probably in acute dilatation.

I merely offer my experience against large single doses of blood transfusion.

Dr. L. A. J. Brennan: I am somewhat prejudiced against the intravenous administration of drugs promiscuously and think we are leaning too far on that side in the treatment of diseases. I believe we should know and use the best method of employing any advocated therapy, especially with whole blood in transfusions and saline in infusions. The consensus of opinion today is that whole blood is very beneficial. It is a true stimulant promoting normal body function. My opinion is that the use of saline solution in unskilled hands is preferable to whole blood transfusion in the hands of the same, and I believe also that many of our cases of septicemia die, especially in certain cases where there is an increase of certain bacteria, such as the pneumococcus, in the blood stream. The viscosity of the blood is increased to such a point that in some cases of bacteremia the blood does not flow steadily thereby increasing stagnation and coagulation. Saline dilutes the blood thereby decreasing the viscosity and allowing the blood to flow more easily. This prevents thrombosis which is more liable where the increased toxins in the blood may cause crenation and disintegration of the red blood cells which may cause death from thrombotic promotions in the blood vessels. This is illustrated at autopsy in the finding of septic thrombosis. Thrombotic ulcers are found in the intestines, (terminal ulcers I like to call them). Again, coma in septicemia is often due to the distinctive action of the toxins on the cortical brain cells saline infusion dilates the toxins present in the blood and thereby diminishes their distinctive action on the somatic cells throughout the body in general. Saline transfusions are the simplest to give and ought not to be lost sight of in the adoption of other drugs, or discarded because it is a drug used intravenously. Saline, and also whole blood, are very beneficial in septicemia and should be used. Whole blood should be reserved for those cases of septicemia showing a progressive anemia.

I want to emphasize what Dr. Jacobs says, that, transfusions should be given in small volumes; given in large amounts they might cause acute cardiac dilatation.

I agree with Dr. Cassegrain that in combating septicemia it is of the greatest importance to determine the type of infection you are dealing with. If a streptoccal infection, use the antistreptococcal serum, which may neutralize the toxins as they enter the blood stream; repeating the serum every eight hours to take care of the new toxins that are formed. Serum, given intravenously, also dilutes the blood, thereby decreasing the percentage concentration of toxin in the blood. It also acts as a food and helps to nourish septic patients.

In staphylococcal infections hexamethylenamin has proved a very useful drug. While some men recommend using this drug intravenously, I am strongly against this method of use. Hexamethylenamin is taken up from the alimentary tract in large enough quantities if given by mouth. I get results from its oral use and I believe it is most likely a better way of administering it than by directly introducing it into the blood stream. I believe that when hexamethylenamin is given by mouth it enters the blood in a changed form. This is done by the liver. We must not lose sight of the fact that the liver is an important organ in converting our drugs given by mouth from toxic forms to non-toxic

forms before allowing them to be thrown into the blood stream. Therefore hexamethylenamin should be given by mouth, not intravenously, and administered continuously. You must not alkalinize your patient when using hexamethylenamin in septicemia.

Dr. Aldo Castellani: The subject of septicemia is of great interest to medical men practicing in the tropics. I remember that in Ceylon and India, septicemia used to be the bug-bear of both internist and surgeon.

I should like to say a word regarding the prognosis of the condition. We must distinguish between the types of septicemia. Streptococcal septicemia has a very grave prognosis; in staphylococcal septicemia the prognosis is not so grave. With regard to treatment, this is in my experience most unsatisfactory; sera, vaccines, and drugs are as a rule of very little use. In staphylococcal septicemia tin preparations (stanoxyl, etc.) seem at times to be useful.

I should like to call attention to a type of septicemia which is very little known; mycotic septicemia, or septicemia caused by fungi higher than bacteria. This type of septicemia is very rare, but does exist. Cases of Blastomyces septicemia have been seen by several observers, including myself, and in the Far East I saw a case of Sporotrichum septicemia.

The patient had had a slight accident to the middle finger of the left hand. The physician who treated him applied a mercury perchlorid lotion and all symptoms disappeared. After three months the patient developed fever of an intermittent type with at times rigors. There were no definite symptoms on which to make a diagnosis and the doctor who attended to him thought the patient had malaria, but quinine given in massive doses did not influence the fever. In the blood microscopically I found spore-like bodies of a fungus. A few days later the patient developed a small gumma-like swelling in the right mammary region from which S. *schenki* was grown in pure culture. Potassium iodid induced a complete cessation of the fever, and the patient recovered.

Dr. Isidore Cohn (closing): I am indeed grateful for the love feast we have had with regard to the methods of treating septicemia, by chemotherapy, hemotherapy, etc. I have purposely limited my remarks to the modern conception only, for the entire subject cannot be covered in twenty minutes.

As Dr. Castellani says, there are "septicemias and septicemias" and I am grateful to him for telling us of a type unknown to us.

I will confine my closing remarks especially to the widespread discussion of the new drugs, mercurochrome and gentian violet. Dr. King mentions a case where a splendid improvement took place in twenty-four hours following mercurochrome injections. I wish to cite a cure, apparently due to the intravenous administration of formaldehyde:

(See report of case of Barrows embodied in paper.)

We, of course, agree with Dr. Cassegrain that the ideal way to combat septicemia is to prevent it, but what of those cases that come to you with septicemia, too late for prevention?

I might say to Dr. Jacobs that a well organized team is absolutely essential in the use of blood transfusion, otherwise transfusion is going to cause a sudden reaction more often than you think.

Dr. Brennan has called our attention to urotropin, which brings us back to another of Young's hopes. In 1909 S. J. Crowe, working with Young and Cushing, eulogized urotropin. That is when the craze took a hold. You could cure a cold, meningitis, gall-bladder disease, etc.—it was due to the formaldehyde liberated in the system. We know that it does no good in gall-bladder disease or meningitis. And there are not many people who can boast such excellent results from its use as Dr. Brennan.

CARBON MONOXID POISONING,*

WITH REPORT OF NEW CHEMICAL TESTS FOR THIS GAS IN THE BLOOD.

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and
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Carbon monoxid is a colorless, tasteless, and practically odorless gas. These negative characteristics are very important because they render difficult the recognition of this substance by the unaided senses. It is also very inflammable, being the most important constituent of illuminating gas. It is lighter than air and hence rises and becomes diffused instead of settling in low places, as is the case of carbon dioxid, which is heavier than the atmosphere. "The actively poisonous character of CO * * * and the very common fulfillment of the conditions under which it may be discharged into inhabited places render it practically the most dangerous of toxic gases." (Witthaus.) It is given off in the manufacture of lime, charcoal, gunpowder

*Contribution from the Biological Research Laboratory of Birmingham-Southern College, Walter C. Jones, Director.

and other high explosives, and celluloid; it escapes in the combustion of gasoline and in the slow burning of coal. If the latter burns rapidly, CO_2 instead of CO is liberated. Even tobacco smoke contains small amounts of CO. A gasoline engine adjusted with too much fuel may render a closed garage dangerous to human life in five minutes. One part in 2000 of air is injurious and two parts in 1000 are hazardous to life. Coal gas contains from 4.0 to 7.5 per cent of CO; and water gas, from 30 to 35 percent.

The involvement of cases of carbon monoxid poisoning legally is not uncommon, for it is often difficult or impossible to determine whether a death from this gas is accidental, suicidal or homicidal. Also, sudden death from this cause is diagnosed frequently as due to heart disease, cerebral hemorrhage, status lymphaticus, etc. In some cases it is necessary to determine whether death was due to CO poisoning, so that the compensation liability of the company concerned may be ascertained.

PATHOLOGY

Pathogenesis.—All of the manifestations caused by carbon monoxid poisoning are due to the great affinity of hemoglobin for this substance, combined with the fact that the union of oxygen and hemoglobin is very unstable. The avidity of hemoglobin for CO is two hundred times as great as for oxygen. Thus oxygen is excluded from the blood and the tissue cells are asphyxiated. When the erythrocytes have become one third saturated, symptoms appear and they become urgent with one-half saturation; while death supervenes when sixty to seventy per cent of the hemoglobin has been converted into CO-Hb. A small amount of carbon monoxid, about 0.08 to 0.18 per cent, is present in the blood of normal animals and human beings, especially dwellers in cities. Absorption of carbon monoxid from the lungs is rapid if it is present in sufficient quantity. In an atmosphere containing ten per cent CO, more than eighteen per cent saturation of the blood occurs in animals in one to two minutes. Fatal results may follow inhalation of carbon monoxid in small amounts if continued over a sufficiently long period of time. It is a typical cumulative poison.

Morbid Anatomy.—There are three findings that are so characteristic in the cadaver of a person dead from CO poisoning that they may be said to be pathognomonic. They are, (1) the bright red color of all the organs and tissues, including the blood, (2) the fluidity of the blood, and (3) the preservation of the body from decomposition. These features are most evident in the lungs and decrease in prominence as one follows the blood away from these portals of entrance of the poison, until the abnormal changes are found to be least marked in the superior and inferior venae cavae and their contents. The exception to this rule is the muscles, which are always markedly affected, whether near to or far from the lungs and heart.

In one of our cases, the color of the cadaver was such a marked red that this was noted by persons present who never before had seen an autopsy. This redness is most marked in the lungs and the muscles. In the blood it may be masked by the simultaneous presence of carbon dioxid. The gastro-intestinal tract is reddened and this feature may suggest the action of an irritant poison taken by mouth. In the latter case, the color is most marked in the upper end of the alimentary canal, decreasing toward the lower end; while in CO poisoning, the redness is distributed evenly throughout the entire tract. The preservation of bodies by this gas from putrefaction is very striking. In the case just mentioned, although the patient had been dead three months and the body had not been embalmed, yet the only sign of gross decay was mold on the face; and microscopic slides from the organs presented good histologic pictures. The usual post mortem odor was absent. In subacute and chronic cases, the heart and nervous system frequently suffer degenerative changes, especially hemorrhage and softening in the cortex and the nuclei of the

brain. Also, serous effusions are found in the pleural cavities.

SYMPTOMS

The symptoms of CO poisoning present every gradation from severe instances, where the victim enters into an atmosphere heavily laden with the gas and dies quickly, to the very mild cases where the patient suffers only from slight dizziness, nausea, and headache. Witthaus* divides the course of a typical acute case into four stages as follows: 1. Among the first symptoms to appear are headache, dizziness, lachrymation, tinnitus aurium, somnolence, nausea and vomiting, and general weakness. Respiration may be accellerated and dyspneic at first; later it becomes slower. The action of the heart is increased early and afterwards it becomes slow and irregular. Sometimes in this stage there is psychic exaltation like that of alcoholic intoxication. 2. The second stage is characterized by intensification of the manifestations of the first stage. In addition, the face becomes red and the pupils dilated. This redness of countenance is very significant. Motor disturbances occur, varying in intensity from mere tremors to clonic spasms. Consciousness is usually lost though it may persist, not only at this time but even into the next stage. 3. During the third stage sensation and motility are generally lost. Paralysis advances and when the respiratory center becomes involved death occurs by pulmonary edema. 4. This is the period of convalescence, primarily. However, during this stage the patient may die upon attempting even slight exertion. After recovering consciousness, the patient passes through symptoms similar to those described in the first stage. The temperature is subnormal.

The chronic form of poisoning by CO is not uncommon. "Persons exposed to constant absorption of carbon monoxid ..... are liable to a form of chronic poisoning characterized by headache, nausea, impairment of memory, mental dullness, muscular weakness, incoordination of motion, marked anemia, and sometimes even epileptiform or apoplectic attacks." (Witthaus.) Polycythemia is a very constant finding. Leukocytosis and glycosuria may occur in slowly fatal cases. This form of the malady is insidious in its onset and its cause is frequently overlooked merely because the physician does not have in mind CO poisoning as a possibility.

Sequelae.—Recovery from carbon monoxid poisoning usually is rapid; but when large amounts of gas have been absorbed the effects are marked, especially on the nervous system. Mental derangements, such as defective memory, mental depression, lack of initiative, defective will power, and confusional insanity are not infrequent after severe poisoning by this gas. Local paralyses and even hemiplegias may supervene. General weakness may be present for a long time. Vision is sometimes impaired. Relapses may occur after apparent recovery; these are due usually to involvement of vital nerve centers and they may lead ultimately to a fatal issue.

DIAGNOSIS

The diagnosis depends upon the history, symptoms, and blood examination; and after death, the autopsy findings. A history of possible exposure is exceedingly important. The symptoms in acute cases are very much like those of other narcotics or anesthetics. One particularly distinctive sign is redness of the face. The single procedure which makes the diagnosis absolute is the finding of carbon monoxid in the blood. The three all-important gross post mortem characteristics, namely, redness of the tissues, their preservation from decomposition, and the fluidity of the blood, have already been discussed. It remains now to take up the chemical examination of the blood in detail. Carbon monoxid has been found in the blood of patients following recovery as long as two weeks after the accident; and in fatal cases, it can be demonstrated chemically many months after death.

*Manual of Toxicology, 2 ed., William Wood & Co., New York, 1911.

TESTS FOR CO IN THE BLOOD

A rather large number of tests have been devised for detecting CO in the blood. The names of most of these, the various steps in carrying them out, etc., are shown in Tables I and II.* We have repeated all of these tests many times with varying dilutions of bloods, with different amounts of chemical reagents, etc., and thus have determined the optimum amount, etc., to be used in each procedure. This was necessary because the writers on this subject for the most part are not precise in describing the steps of the tests, sources of error, and various other points. We have found all of the tests very satisfactory except the one with phenylhydrazin. It is important to note that all of the tests described in Tables I and II apply best to blood which contains CO to the point of saturation.

Dilution of the Blood.—The determination of the optimum amount of water to be added to the blood in any given test is probably the most important point to be considered. In some instances, high dilution spoils the procedure, for example the mercuric and the zinc chlorid tests. In other cases, for instance the pyrogallol test, the dilution must be marked; while in the ammonium sulphid test the degree of diution is immaterial. There are more tests which require a small amount of dilution than there are that need a large proportion of water. This requirement moreover may vary from time to time, according to the varying percentages of CO in different specimens of blood, the quality of the chemicals used, and perhaps other factors. Hence it is safest to find out in each test with each specimen the most favorable dilution. This may be done easily by beginning with undiluted blood or diluted with only one or two parts of water. Then after the chemicals of any particular test have been added, dilute the mixture gradually and note the point where the contrast between the known positive and the known negative is greatest. Also, when too high a dilution has been made, the final colors may be brought into sharper contrast by adding drop by drop more undiluted CO blood to the CO tubes, and more undiluted normal blood to the normal tubes. These simple procedures make it possible to adjust accurately the dilution of each blood to fit most advantageously the peculiarities of each test.

Strengths of Chemical Solutions.—Although we have given in Table I a definite percentage concentration for each chemical, it is not absolutely necessary to use these amounts. They are merely quantities which we have found convenient and accurate. In nearly every instance, one may make a saturated or a half saturated solution and add it drop by drop to the blood until the maximum result, if any, appears. Of these concentrated solutions, one needs usually only relatively small amounts. In all of these tests except five, only one chemical is used.

End Reaction.—A positive result is indicated by the appearance of a red or pink color, which offers a distinct contrast to the chocolate brown of the control containing no CO. There may or may not be a precipitate or coagulum. If the blood is undiluted or only slightly thinned with water, the formation of a coagulum is the rule. If the blood is diluted moderately a precipitate forms; and if it is highly diluted, the chief or only change is one of color. The only exception to the appearance of a red color as the indication of the presence of CO, is the black precipitate produced by palladous chlorid. (This test is not included in the tables.) We have usually found the evidence of a positive result to appear at once, although a few authorities claim that in some instances there is a delay of several hours or longer. The most peculiar feature of many of these tests is the persistence of the red color indefinitely if the tubes are stoppered and set aside. We have preserved in this manner tannic acid, heat, and other tests for

*The platinic chlorid and the palladous chlorid tests have been omitted because these chemicals are expensive and they are not commonly used.

many months, and after this length of time the pink color was almost as marked as it was at the time the tests were first set up.

General Method.—Accurate results can be obtained with most of the tests described by proceeding as follows: Dilute the unknown blood with one or two parts of water. Make up half saturated solutions of the chemical reagents. To one or two cubic centimeters of blood (diluted) add a few drops of the proper chemical or chemicals. If the result is negative, dilute the mixture up to at least fifty parts of water to one of blood. If still negative, repeat the procedure with larger amounts of the reagents until equal parts of blood and reagents are used. Of course this general rule does not apply to the tests by heat and by simple dilution.

Sources of Error.—The sources of error are described in Tables I and II. They consist mostly of too high or too low dilutions of the blood. This point has already been discussed. In the heat test, some authors advise the boiling point; but we have found invariably that so high a temperature spoils the test. It should not go higher than 80°C. In viewing the tubes in any of the tests, one may use either transmitted or reflected light, and with the latter, various colored backgrounds; but usually the best results are obtained with light reflected from a white surface.

Controls.—Two controls should always be set up with each chemical test for CO, one with known normal blood and one with blood known to contain a considerable amount of CO. The latter is prepared by generating CO and passing it through normal blood. CO is generally obtained by heating oxalic acid in the presence of sulfuric acid. The latter aids in the reaction by absorbing the water liberated, and perhaps it acts also as a catalytic agent. Oxalic acid breaks up according to the following equation: $C_2H_2O_4 \rightarrow H_2O + CO + CO_2$. The CO_2 is eliminated by passing the gas through strong (at least fifty per cent) sodium hydroxide solution, which absorbs much of this gas. Then the discharge tube leads into lime water in which a precipitate of calcium carbonate is formed from the CO_2 not absorbed by the sodium hydrate solution. Thus the lime water acts both as an indicator of the extent to which the CO_2 has been removed by the strong alkali, and also it aids in the process of purification by using up CO_2 itself. The gas tube finally leads to the bottom of a jar containing normal blood, where of course CO is absorbed. We desire to emphasize the importance of having a known CO control with every test. Many of these cases are medico-legal; and it is impossible to have one's work along this line stand the strain of court procedures without controls with both known normal and known CO blood. It is immaterial whether human blood or that of animals is used. The former probably is more convincing to a jury.

PROGNOSIS.

The chief point to remember in this connection is caution in predicting ultimate recovery after the patient has emerged from the immediately acute symptoms. Recovery usually is complete within a few days but sometimes the after effects persist for weeks or months or even years. Patients who have lived from one to three months after the acute stage of CO poisoning have been known to die ultimately from the results of the attack.

TREATMENT.

Prophylaxis. — Information should be scattered more widely concerning the numerous sources from which carbon monoxid may arise and poison human beings. Most people already know the hazards of illuminating gas but comparatively few realize the danger from running a gasoline engine in a closed room. People working around charcoal furnaces, lime kilns, plants where explosives are manufactured, etc., should be warned of the presence of CO and of its toxic effects. With the least onset of headache, nausea, palpitation of the heart, etc., these workers should be instructed to seek fresh air.

TABLE I—CONDENSED DESCRIPTION OF TESTS FOR CO IN THE BLOOD, MADE BY MEANS OF CERTAIN SALTS AND ACIDS.

For further details, see text.

CHEMICAL GROUPS		SALTS						ACIDS		
NAME OF TEST		MERCURIC CHLORID	LEAD SUBACETATE Rubner's	POTASSIUM FERROCYANID	COPPER SULPHATE Zaleski's	ZINC CHLORID	PHENYLHYDRAZIN	TANNIC ACID	PHOSPHOMOLYBDIC ACID	PICRIC ACID
A	CHIEF CHEMICAL SUBSTANCE	Mercuric Chlorid ½ S. S.	Lead Subacetate 25%	Potassium Ferrocyanid 20%	Copper Sulphate ½ S. S.	Zinc Chlorid ½ S. S.	Phenyldrazin Hydrochlorid, ½ S. S.	Tannic Acid, 1.0%	Phosphomolybdic Acid, ½ S. S.	Picric Acid, ½ S. S.
B	ADJUVANT CHEMICAL	None	None	Acetic acid, 30%	None	None	None	None	None	None
C	DILUTION— BLOOD : WATER	1:1 to 1:3	Undiluted to 1:3	Undiluted	1:1 to 1:4	1:1 to 1:5	1:1	1:4 to 1:10	1 : 1	1 : 1
AMOUNTS, A, B & C USED IN TESTS		A = C	A = 4 to 5 cc. C = 1 cc.	A = 7 cc. B = 1 cc. C = 7 cc.	A=1 to 3 drops C=4 cc.	A = C	A = C	A = 3 cc. C = 1 cc.	A = C	A = C
PERSISTENCE, RED COLOR WHEN TEST IS POSITIVE			Increases on standing. Lasts few hours, sometimes longer.		Few minutes to 2 hours.		Few days	Many months		Several weeks
SOURCES OF ERROR		Dilution must be below 1:10	Color, faint at 1:15. Undiluted, best.		Not use too much $CuSO_4$. Low dilutions best.	Must use low dilutions. 1:10 spoils test.		Keep within dilutions mentioned above.	Higher dilutions give poor results.	Higher dilutions give poor results.

Curative Treatment.—The chief features of the immediate treatment in acute cases are, (a) removal from contaminated air, (b) artificial respiration, and (c) insufflation of carbon dioxid. The value of the first step is self-evident. Artificial respiration is of great importance and should be kept up for a long time in desperate cases, for recovery ensues sometimes when apparently there is no hope. The inhalation of oxygen alone is of little or no avail; but carbon dioxid is of great value in stimulating the respiratory center and in restoring the patient, as has been shown by Haggard and Henderson.*

PERSONAL EXPERIMENTS

It occurred to the senior author that the substances used to intensify and fix the colors in staining bacteria and tissues might serve as favorable reagents to demonstrate the presence of carbon monoxid in the blood. The most common of these mordants are phenol, alum (aluminum-potassium sulphate), and anilin (oil). The methods of procedure were as follows:

PHENOL TESTS

Phenol Alone.—1. Undiluted. To undiluted blood in test tubes add 95 per cent phenol in the proportion of 2 to 6 drops to each cubic centimeter of blood and mix thoroughly. Carbon monoxid blood turns a brilliant pink and normal blood, a very markedly contrasting dark chocolate. The immediate results are a little better with the larger proportions of phenol. The colors usually become a little more prominent on standing a few hours to a few days and they persist strikingly for many days. Less than 2 drops of phenol to each cubic centimeter of blood give uncertain results; 8 to 10 drops yield an immediately brilliant reaction but the colors may fade; the pink of the CO blood sometimes disappears completely in three to five minutes with this larger proportion of phenol. The drops in this, as in most of the other tests, were measured with an ordinary medicine dropper held at an angle of about forty-five degrees. This test may be done by means of blood diluted with half as much or an equal quantity of water. The results seem to be about the same except that the colors develop a little more promptly; but our best tubes have occurred with untreated blood. It is interesting to note that normal blood coagulated less promptly in this test than CO blood, in spite of the usual tendency of the latter to maintain its fluidity.

The mixing of undiluted (or slightly diluted) blood with coagulating reagents is accompished best by holding the top of the test tube between the thumb and the first two fingers of one hand and striking the side of the tube near the bottom against the palm of the other hand, maintaining the tube in an almost horizontal position during the procedure. This is better than shaking the contents throughout the entire tube because the latter method leaves most of the mixture clinging to the sides of the container, spoiling the appearance of the tube and rendering observations difficult; and mere stirring with a rod does not allow the degree of aeration that seems to be necessary in some of the tests. Sometimes, however, a little stirring is necessary to break up coagulated masses which are adherent to the bottom of the tube. We have observed this phenol test to turn out entirely negative when the mixing was accomplished exclusively with a stirring rod; and when repeated with no other change except that the mixing was done by the method recommended above, it was beautifully positive.

Diluted Phenol Test.—Equal parts of 5 per cent aqueous solution of phenol and undiluted blood yield a very satisfactory result. The CO tube turns a marked red and the normal one, a blackish brown. The reaction is immediate and persists many days to several weeks. The CO blood coagulates incompletely while the normal blood becomes entirely solid. In the tests in which the blood is well diluted either directly or by the addition of diluted re-

*Haggard, H. W., and Henderson, Y. The Treatment of Carbon Monoxid Poisoning. Jour. Amer. Med. Ass'n., lxxvii, 1065-1068, 1921.

TABLE II—CONDENSED DESCRIPTION OF TESTS FOR CO IN THE BLOOD, MADE BY MEANS OF CERTAIN BASES AND OTHER MISCELLANEOUS SUBSTANCES. For further details, see text.

CHEMICAL GROUPS		BASES		MISCELLANEOUS					
NAME OF TEST		SODIUM HYDRATE Salkowski's	SODIUM HYDRATE Hoppe-Heyler's	PYROGALLOL	DEXTROSE	HYDROGEN SULPHIDE	AMMONIUM SULPHIDE	HEAT	SIMPLE DILUTION
A	CHIEF CHEMICAL SUBSTANCE	Sodium Hydrate 26.8%	Sodium Hydrate 26.8%	Pyrogallol ½ S. S.	Dextrose Powder	Hydrogen Sulphide, aq. sol. S. S.	"Orange" Ammonium Sulphide*	Heat in water bath	Water
B	ADJUVANT CHEMICAL	None	None	Potassium Hydrate 5%	Potassium Hydrate 5%	None	Acetic Acid, 30%	None	None
C	DILUTION—BLOOD : WATER	Undiluted	1 : 20	1:1 to 1:10	1:3 to 1:20	1:2 to 1:50	1:1 to 1:50	Undiluted	1:2 to 1:50
AMOUNTS, A, B & C USED IN TESTS		A = C or ½ C	A = C	A = 5 drops B = 5 drops C = 2 cc.	A = 0.1 gram B = Alk. react. C = 2 cc.	A = 1 to 3 cc. C = 2 cc.	A = 0.2 cc. B = 0.2 to 0.3 cc. C = 10 cc.		
PERSISTENCE, RED COLOR WHEN TEST IS POSITIVE		Several hours	Few hours	Few minutes	Many hours	Few hours		Many weeks	Several hours
SOURCES OF ERROR					Do not use too much alkali			Over 80° to 90° C. usually spoils test	Use white reflected light with higher dilutions

*Orange ammonium sulphide is prepared by adding 2.5 grams of sulphur to 100 cc. of colorless ammonium sulphydrate, or 2 grams of sulphur to 100 cc. of yellow ammonium sulphydrate.

agents, it is well to make the observations both by transmitted light and by light reflected from a white surface, if or as long as the contents remain fluid.

Another good test is accomplished by mixing 20 per cent phenol in 95 per cent ethyl alcohol, and untreated blood in equal parts. The blood may be diluted with an equal amount of water. These diluted phenol tests all maintain their colors at least several days.

Phenol and Acetic Acid Test.—We have tried various strengths of this acid and find that a one per cent aqueous solution is best. To a chosen quantity of blood add half as much or an equal amount of one per cent acetic acid, and 6 drops of 95 per cent phenol to each cubic centimeter of blood. The contrasting dark chocolate and bright red colors of the normal and the CO tubes respectively appear at once, become intensified a little during the first few days, and persist many days or even weeks. The results are about the same if an equal quantity of water is added to the blood. An amount of acetic acid greater or less than the proportions stated above detracts from the success of the test. If the quantity of phenol is reduced to 3 drops, the color of the CO tubes becomes a cherry red. A larger amount, 5 to 10 drops, produces a light bright red, or pink color. If still larger proportions are used, a brilliant red color appears in the CO tube but disappears in a few minutes. A quantity of phenol equal to that of the blood may be used but the color fades in a few seconds.

A good method to determine the most favorable amount of phenol to use is to put it in drop by drop after the other substances have been added, shaking the tubes after each one or two drops. The CO tube soon becomes a cherry red changing to a bright pink which finally fades completely if enough phenol is used. The normal tube shows a dark chocolate color at first; this passes through increasingly lighter shades of brown and finally a whitish color appears in spots if enough phenol is added.

ALUM TESTS.

Alum Alone.—To a selected quantity of undiluted blood add an equal amount or one-half as much of a saturated aqueous solution of aluminum potassium sulphate (alum) and mix thoroughly. The blood coagulates, solidifying the contents of both tubes in a few minutes. When the test is first made, the red color of the CO tube is but little different from that of the normal; but on standing a few minutes to an hour, the positive tube turns a cherry red color and the normal one, a dirty blackish brown. The contrast is very marked. Do not expect this test to show positive results at once. It requires a few minutes to an hour for the red of the normal tube to fade sufficiently so that the red in the other tube will stand out by contrast. If, however, a quantity of water is added equal to the amount of blood used, the contrast between the two tubes appears almost at once; but it is not quite as marked as that which is seen ultimately in the tubes with undiluted blood. It is interesting to note that the tubes to which this amount of water is added, solidify as promptly as those without any water (except that which is included in the alum solution.)

Alum and Potassium Bicarbonate Test—Foam Test.—To a given quantity of blood undiluted or mixed with an equal or a double amount of water, add a volume of saturated solution of alum equal to the amount of blood (not including the dilution); then 4 to 6 drops of a saturated solution of potassium bicarbonate. We have found that dilution with 2 parts of water gives appreciably better results than with one part or with undiluted blood. It makes no difference whether the bicarbonate is added before or after the alum. Various other carbonates and bicarbonates will serve as well as the one mentioned in this connection. The tubes begin to foam profusely while the last reagent is being added. The foam of the CO tube is a bright pink color; the fluid at the bottom, a bright red. The foam in the normal tube is a purplish red and the fluid at the bottom a dark red or almost black. On standing a few minutes the fluid in the normal tube loses entirely any shade of red it had at first and acquires a blackish brown hue, which contrasts still more sharply with the brilliant pink of the CO

tube. These colors persist usually for many days or even weeks. The blood does not coagulate in this test unless undiluted, and then rather slowly.

Alum and Acetic Acid Test.—Take equal portions of undiluted blood, saturated aqueous solution of alum, and one per cent acetic acid in water, and mix by shaking. Better results are obtained by adding each reagent to the blood quickly and then agitating at once or by mixing the reagents before adding, than are obtained by putting in either alone and then shaking before the other is added. The CO tube turns a deep red; the normal one, a dark chocolate. The contents of the tubes become solidified within a few minutes and the color increases in intensity on standing a few hours to a few days. The blood may be diluted with one or two parts of water; also, smaller amounts of the one per cent acetic acid may be used or a few drops of stronger solutions, for example, 20 per cent. There do not seem to be any very likely sources of error in this test.

ACID AND BICARBONATE FOAM TEST

Mix with a given quantity of blood an equal amount of saturated aqueous solution of sodium bicarbonate. Profuse ebulition of CO_2 occurs at once. The foam of the normal blood is purplish red; that of the CO blood a bright pink. The color of the liquid at the bottom of the normal tube is almost black; at the bottom of the CO tube, a deep red. Various other carbonates and bicarbonates besides those of sodium may be used with about the same results. The display of reaction and colors in this test are very vivid and are precisely similar to those of the alum foam test. The colors persist for several days.

METHYL ALCOHOL TESTS

We have tried this substance with many variations and recommend the following combinations: 1. Blood one part, methyl alcohol two parts. 2. Blood one part, water and methyl alcohol each one-half as much. 3. Blood one part, one per cent acetic acid one part, methyl alcohol one-half of one part. With all of these mixtures normal blood turns a reddish black and CO blood a pure deep red. These colors persist for several days. The one in which acetic acid is used we found to be the most satisfactory.

Tests with ferric chlorid alone, with potassium bicarbonate alone, and with analin alone and in combination with other substances are not satisfactory.

In regard to the new tests just described, we desire to call attention to the following features: 1. Most of them are made easily, results appear at once (with the exception of the first alum test) and persist a considerable time, and errors are easily avoided. 2. We recommend especially the phenol and the alum tests. 3. We find that acetic acid (preferably weak solutions) is in general of more value than alkaline bases, bicarbonates or carbonates, either alone or in combinations with other chemicals.

SUMMARY

1. The diagnosis of carbon monoxid poisoning rests mainly upon (a) history of possibly exposure, (b) presence of carbon monoxid in the blood either before or after death, and (d) at autopsy (1) preservation of the body from decomposition, (2) a bright red color of the organs and tissues of the body including the blood, and (3) the fluidity of the blood.

2. The most frequent error in the diagnosis of CO poisoning is the mistaking it for various other diseases. This is due chiefly to the fact that the physician usually forgets to place this malady in his list of possibilities in connection with a diagnosis.

3. For the demonstration of CO in the blood we recommend especially of the older tests those with potassium ferrocyanid, mercuric chlorid, zinc chlorid, ammonium sulphid, lead subacetate, tannic acid, picric acid, heat, and simple dilution; of writers' tests, those with phenol and with alum are the best.

4. More than one test should be made on each unknown specimen.

5. Each test should be made several times with different amounts of the reagents and various dilutions of blood.

NEISSERIAN URETHRITIS AND PROSTATITIS.

CHARLES E. VERDIER, M. D.,

NEW ORLEANS.

The poor ye have always with you, so too, the man with gonorrhoea, poor in health, poor in recuperative powers, poor in his ability to help himself. One should consider the economic factors involved along with the disease acquired, an ambulant poorly controlled patient with a possible symptom complex as intriguing as it is dangerous, more than often casually prescribed for and just as often casually treated, allowed to adopt the contemptuous attitude that is generally assumed toward a malady that is no worse than a bad cold. You will say, we have heard all this before, get to your subject, tell us something new, some remedy, and I will admit that our patient some and pestiferous disease, for most of us would rather not have the patient with gonorrhoea, he is a lot of trouble and is notoriously bad pay. Alas, I have but little new to offer, certainly no magic remedy and I will admit that our patient with gonorrhoea is a lot of trouble, but his is a special kind of trouble and unless you are prepared intelligently to advise him would it not be better for all concerned not to accept the case? One not in daily contact with venerealogy as a special endeavor might at first thought be influenced to believe that the incidence of gonorrhoea is on the wane. Much propaganda of all sorts has appeared, many statistics have been compiled, new agencies have taken the field, municipal clinics, charity clinics, federal aids and so on; and yet Neisserian infection takes first rank among the diseases of men. Why is this disease so hard to control? The answer is obvious. Then how shall we treat these patients?

I will assume that my audience is well acquainted with the anatomy of the parts primarily involved in gonorrhoea in the male, though it is not too much to say that one frequently sees many cases in which there is either a total ignorance of the anatomical make up of the urethra and prostrate or a deliberate intent to ignore what the writer believes to be a fundamental point upon which treatment must be carefully built if one is to achieve success in a craftsmanlike manner.

We have to deal then with a mucous membrane and a glandular structure intimately blended with a musculature which is highly sensitive. It goes without saying that we must carefully individualize each case, though it will appear later that our choice of therapeutic aids is remarkably narrow. I regard the individualization of each case as of paramount importance, one must know the status of his patient absolutely, for upon his position in this world depends his ability to aid you in your attempt to cure, and success or failure often hinges on this very point.

Is the man married? If so during treatment he must sleep alone.

What does he do for a living? Most of us have quite a bit to do, and the following occupations are obviously risky when one considers the liability of complications: Motor mechanics, chauffeurs, engine drivers, those who must stand constantly, those who must use a motor car constantly, those engaged in any occupation which is physically fatiguing, all energetic sports. Do I hear you say, "You have covered everybody"? Exactly the impression I desire to convey, we must temper the wind to the shorn lamb and eliminate every possible thing which may militate against our success and yet we fail. Why do we fail, because of one factor, lack of control of the patient; our treatment, no matter how skillful, no matter how potentially effective, will fail unless we have control of the patient himself and that we have not, so we fail. Yet we do relieve but to say we cure is different. We do not, we never have and we never will, at least until our present methods of treatment are

Read before Orleans Parish Medical Society, March 28th, 1927.

immeasurably improved upon. How then does the patient get well? for some get well, apparently well, you say. Go back to your anatomy. What does the gonococcus of Neisser do to the squamous cell lining of the urethra, what form of epithelium succeeds the destroyed squamous cells, what happens when this squamous epithelium is succeeded? The patient recovers. What then has the doctor done? I will tell you. He has either intelligently aided the reparative process or he has unintelligently retarded it. Remember this point, all of the treatment of your patient with gonorrhoea is by no means the treatment applied directly to the urethra or prostate, one must look carefully to the general health of his patient.

With these more or less illuminating ideas before us what shall we select as a line of treatment for the average case.

We must instruct as to diet. This must be supportive but free from acids and highly seasoned foods. We will insist upon the proper elimination. Here it might be well to speak of the diabolical custom of advising copious drinking of water especially in the acute stage of a specific urethritis. A part that should be at rest cannot be at rest if constantly used to pass an unusual amount of urine over a highly inflamed and very sensitive mucous membrane; for reasons which will appear when therapeutic measures are discussed it is well to restrict liquids.

Rest, physical, and if possible, mental, is imperative especially in the initial stages of the infection. It is my firm conviction that if the average individual suffering from urethritis could be confined to bed from the onset of his infection, he would recover within a thirty day period as a general rule.

It will be noticed that the title of this paper couples prostatitis with urethritis and this for the very apparent reason that despite our best efforts but for the reasons already outlined, prostatitis in either mild or severe degree is a complication in about ninety per cent of cases. Hunner of Baltimore has suggested the advisability of an occasional prostatic massage even before the prostate is actually involved with the idea of promoting as much active immunity as possible for this all important gland. I have found this to be good practice. It is truly astonishing, to those unaccustomed at least, to find the gonococcus in a centrifugal specimen of prostatic fluid when the casual examination of a loopful of the expressed discharge may not show their presence. Hence always centrifuge your prostatic secretions. The Johns capillary tube method is perhaps the most exact, though an ordinary well tapered test tube properly whirled will do admirably. Assuming then that we have arrived at a definite diagnosis and properly classified the pathology of our patient we will discuss the local treatment to be used. As before stated our therapeutic effective range is limited, myriad though the advised remedies may be.

During the late unpleasantness of the Hunnish attempt to regulate the world I sought to do my bit with the colors thinking that my services might be limited to something at least embraced by red, white and blue, but it soon transpired that this was to be but a magnified endeavor closely patterned after my professional work in civil life. With abundant material, *carte blanche* as to applied effort and asked only to produce results as quickly as possible, it was a rich experience. The time tested remedies were given first call, then newer and still newer plans were tried and out of it all came a simple technic with a remedy that fulfills the qualifications which a drug must have to achieve results. Here let us ask the question: what qualities must a drug possess in order that it shall have first rank to consideration; I list the following: 1. It must kill the organism against which it is directed; 2. It must be unirritating to the tissue to which it is applied; 3. It must, in the malady which we are discussing penetrate mucous membrane and glandular structures; 4. It must

stay put, and thus exert an action over a period as long as is possible. A drug which answers these qualifications is neutral acriflavin. Used in a jelly like preparation of karaya gum with a slight addition of sodium bicarbonate and in a strength of 1-1000 it will be found to meet the above requirements. The writer is indebted to Abbott Laboratories for their assistance in perfecting neutral acriflavin jelly which, with the following technic, I have found to be a first class routine local treatment for gonorrhea in the male. I give internally one grain doses of neutral acriflavin at six hour intervals with a restriction of liquids to the point of just satisfying normal thirst. Locally, I employ the following technic: Have your patient report for treatment with a full bladder; if the disease is limited to the pendulous urethra, after the urine is voided, pass a small olivary tipped Guyon flexible instillator down to the cut-off muscle and carefully and very gently instill from Luer glass syringe about two drams of the neutral acriflavin jelly, gently withdrawing the syringe as the instillation is made. A small pledget of cotton over the external meatus or a light bandage and cotton complete the treatment and the patient is requested to refrain from urination until pressed to the act. It will be found that patient can and will carry such a treatment very comfortably up to five hours at a time.

In the case of anterior urethritis alone an occasional massage of the prostate with an examination of the centrifuged specimen is done to anticipate extension as well as to promote prostatic resistance.

In the face of an established prostatic involvement the prostate gland is massaged on a full bladder on alternate days and the instillation of the jelly is made directly to the gland each day after the bladder is evacuated. In my experience with the above technic I have found that the factor of gentleness is of the greatest importance. with your instillator well lubricated with the jelly but very little discomfort is experienced by the patient. Chordee is a rare occurrence and testicuar complications are kept at a minimum. A word as to the removal of the acriflavin stains; there is a soap called lava soap largely used by automobile mechanics to remove grease stains which will at once remove the stains of acriflavin.

Results from treatment as to a time limit will vary largely with the class of patient, the pathology produced and last but not least the gentleness of the operator. Suffice it to say, that in my experience the simple uncomplicated anterior urethritis has responded to the above treatment within a period of four weeks, while the prostatic case has gone to an outside limit of six months. Urethras endoscoped after a successful restoration to approximate normal always taking into consideration nature's substitution in relation to the mucous membranes involved, show no evidence of stricture formation as is so frequently found when other methods, particularly the astringent ones, are used.

DISCUSSION.

Dr. W. A. Reed (New Orleans): The subject brought up by Dr. Verdier is extremely interesting to me. In the issue of Feb. 12th, of the J. A. M. A. there appeared an article by Drs. Harrold and Culver of Chicago, in which they gave a summary of their results in the treatment of gonorrheal urethritis with acriflavin incorporated in gelatin. The article was almost dogmatic in stating that their results were without failure. They used a mixture of acriflavin and gelatin in strength of 1-400 and even as strong as 1-250. The acriflavin was mixed with a 10 to 15 per cent solution of gelatin. The mixture was used three and four times daily and injected with an ordinary urethral syringe. They reported complete cures in anterior cases—in from four to five weeks, and in posterior cases, in eight weeks at the outside. This seemed so good to me that I became enthused and started using it. I followed their direction very carefully with regards to its preparation. I took the liberty of using it on my private patients rather than in the clinic in order to have complete control of the cases and avoid giving the treatment in any haphazard fashion. I started with the mixture of acriflavin 1-400 in a 15 per cent gelatin. I soon found that this was irritating and it became a case of either losing my patients or

change my methods—consequently, the strength was cut to 1-500, 1-800, 1-1000 and even to 1-2000. The results were more or less the same, regardless of the strength—irritation being produced in practically every case after a shorter or longer period of time. About 50 cases were treated in all before I decided to discard it for old and recognized methods. Perhaps it was due to faulty technic, but I was unable to obtain the beautiful results claimed by Drs. Harrold and Culver. Four or five years ago, Dr. Nelken and I worked along these lines with acriflavin. The results in some instances were good, cures being obtained in from ten to fifteen days in some cases, while in the majority, there was so much reaction that we were compelled to resort to our old method of treatment. Again, let me state that it is possible that my poor results were due to errors in the technic of using acriflavin.

Dr. Charles E. Verdier (closing): The preparation mentioned in my article is a jelly-like substance resembling our various lubricant jellies. It is absolutely non-irritating. Acriflavin is irritating in solution—as Dr. Reed says; there is no question about it. To begin with, these patients have a highly inflamed and exceedingly sensitive mucous membrane. There are cases that we all see in which our best judgment dictates that we use hydrotherapy, sometimes as long as forty-eight hours, before any method other than the application of hot water be tried. This jelly that I speak of has no irritant properties whatsoever, it is not oily, and when applied dissolves, leaving the drug behind. The addition of a small amount of soda bicarbonate is of further aid in neutralizing the irritating quality of acriflavin. I have had patients tell me how comfortable they felt after treatment. A man comes in complaining of pain and burning during the urinary act and there is evidence that he is suffering from discomfort. He is treated and goes out carrying this preparation in situ; in a very short time relief is experienced. Now, if the preparation was irritating the patient would certainly not report such a satisfactory result.

We get results—it helps to cure gonorrhea. I give it to you for what it is worth.

EXTENSIVE COLONIC POLYPOSIS.*†

REPORT OF THREE CASES.

A. L. LEVIN, M. D.,
NEW ORLEANS.

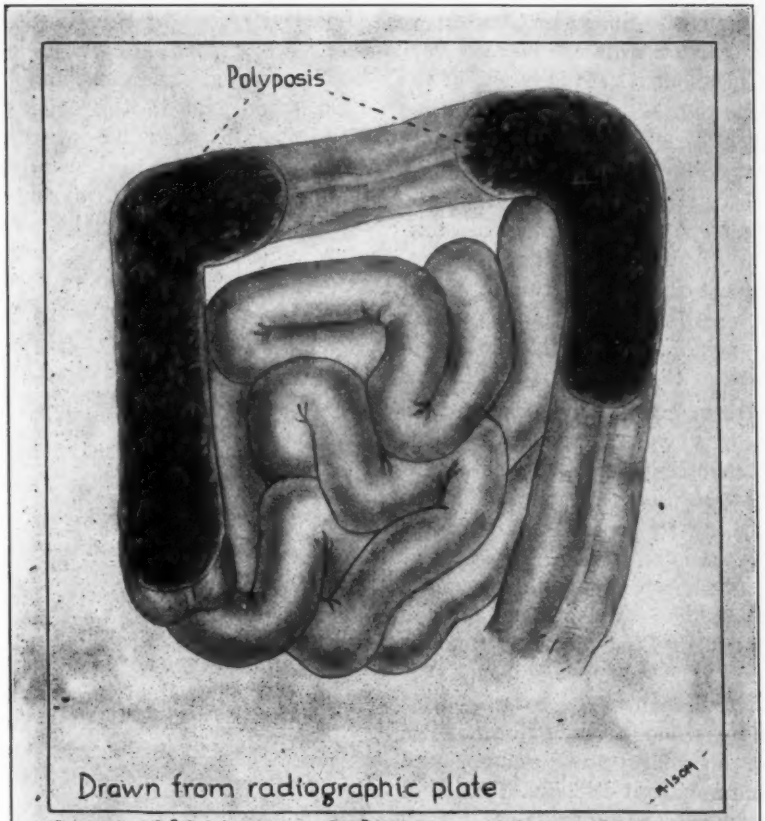
The subject which I am presenting for your consideration is of great clinical significance. The failure on our part to recognize early an existing colonic polyposis leads to a very grave prognosis. Coffey makes the statement, "that there is probably no benign process in which there is a higher incidence of malignancy than colonic polyposis." Struthers in a report of twenty cases observed at the Mayo Clinic between Feb. 1, 1920, and January 1, 1923, concludes his remarks with a pessimistic view thus: "Multiple polyposis of the gastro-intestinal tract is a serious disease from the standpoint of morbidity and mortality. The cause of intestinal polyposis is not known, although chronic ulcerative colitis appears to be a prominent factor. There is no specific medical treatment and early operation undoubtedly offers the best results in all cases."

The closing paragraph of an article by Erdmann & Morris offers but slight hope in the way of cure. It follows: "Indications for treatment are the depleting hemorrhage and diarrhea and the high malignancy incidence. Non-radical palliative treatment comprises cecostomy, appendicostomy, irrigations and radium therapy. Excision of the polyp-bearing area is limited by technical difficulties and the inability to predict, pre-operatively, the extent of the process."

The above quotations from the pen of leading authorities in medicine and surgery are emphatic enough to impress upon us the two practical problems when we are confronted with a consideration of such cases: the advantage of an early diagnosis and the danger of malignancy. It is surprising to me that our most modern textbooks, with the exception of Gant and Stevens, have nothing or very little to say about the subject. The three cases which I am reporting came under my observation in the past ten months, all in young males between the ages of 21 and 32. Their complaint was a chronic dysentery with blood and mucus in the stools; the duration of illness was from about six months to five years. Protoscopically, they showed a chronic ulcerative colitis of an unknown

*Read before the Orleans Parish Medical Society, May 23, 1927.

†From the Graduate School of Medicine, Tulane University.



Case 1. G.M.S. Male, age 21. Duration of illness, 3 years. Diagnosis: Extensive Colonic Polyposis and chronic Ulcerative Colitis. Ileostomy 2 months. Prognosis poor. Note the loss of haustral marking and the diminution in width of bowel characteristic of chronic Colitis.

etiology; one had polypi in the rectum. Their symptoms are vague abdominal pains, rectal tenesmus, mucus, pus and blood in the stools, a variable degree of anemia and loss of weight. Of the three cases: the first one is in a serious condition, the second one died and the third one has not improved in spite of heroic medical measures. He refuses surgical intervention so far. The diagnosis of the first one was made by a proctoscopic examination and roentgen-ray visualization of the colon; in the second case, the proctoscope did not reveal any polypi in the rectum and the roentgen-ray failed to demonstrate the presence of polypi, but the post mortem revealed the true nature of the polyposis; in the third, the roentgen-ray demonstrates clearly the existing polyposis. The roentgen-ray plates and artist's drawings will clearly demonstrate to you the extensive nature of the colonic polyposis.

Multiple polyposis of the intestine, or polypoid colitis, is considered a comparatively rare disease. Personally, I do not

entertain such a belief. The fault lies at the door of our teachers and text-books; we failed to recognize the disease because very little was said about it. This is one of the objects of this paper, to call your attention to the frequent association of colonic polyposis with chronic ulcerative colitis.

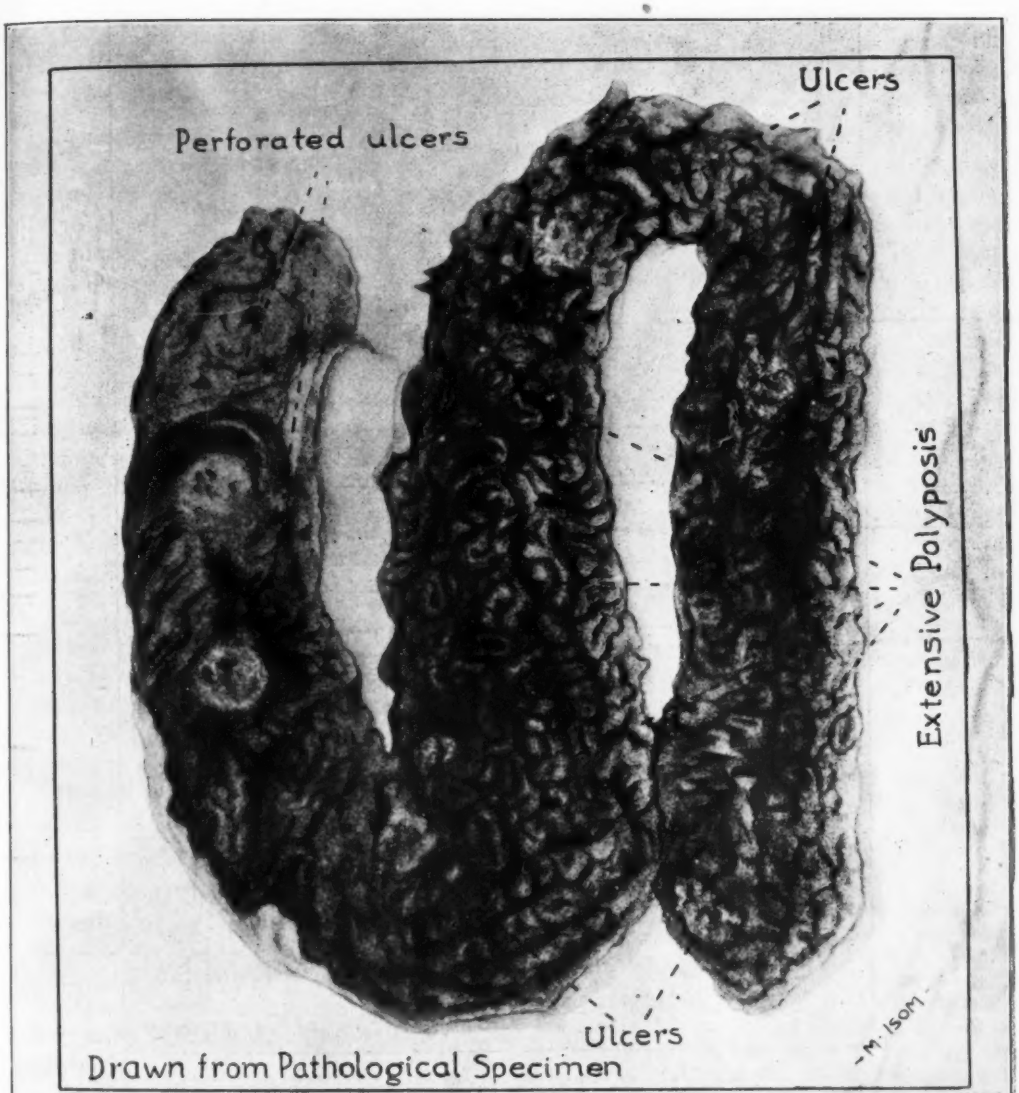
Polypus is a term used to designate, without reference to its histological characteristics, any benign tumor that is pedunculated. Almost all innocent tumors in the intestines, even if sessile at the beginning, become pedunculated owing to the downward pressure of the intestinal contents.

Gastro-intestinal polyps have been carefully studied by various observers from the histological, morphological and anatomical standpoints; no agreement has been reached as yet with regard to a uniform classification. Histologically, they can be adenomata, fibromata, lipomata, myomata or angiomata. The adenomatous type is the commonest histological form and is usually found in the large bowel in multiple or disseminated form. An attempt has been made by some authors to make a classification according to the associated pathology and apparent etiology. Erdmann and Morris suggest a compromised classification, namely:

1. Adult acquired type.
2. Adolescent (congenital, disseminated) type.

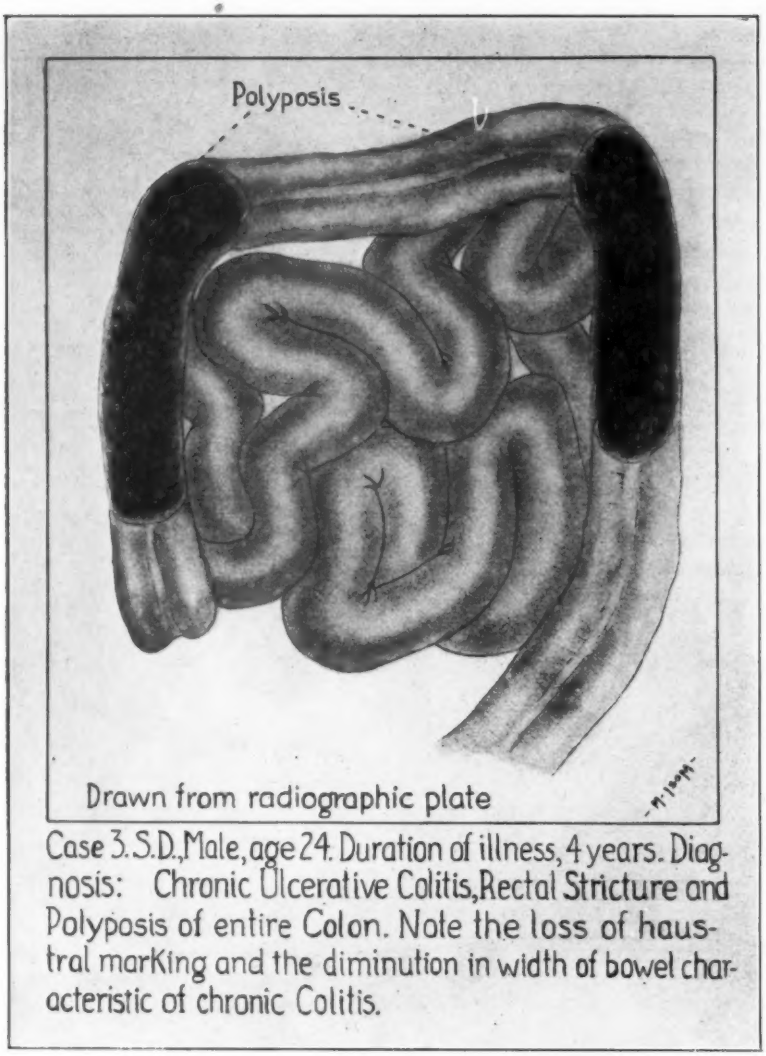
The first, as the name implies, is acquired during adult life from irritation of mucous membrane, such as hemorrhages, erosions, ulcerations, strictures, etc. Usually there are but a few scattered tumors and it may be symptomatically silent throughout life. The second type is usually encountered among young adults. The mucous membrane of the gut, usually the colon, from ileo-cecal valve to anus is thickly and uniformly studded with multiple adenomatous polyps; as a rule other members of the same family are affected; symptomatically, they suffer from dysentery, rectal bleeding, anemia, and loss in weight.

It might be of interest to give a brief historical review of this disease. In 1721, Menzel described a case in which there was a general inflammation of the intestinal tract, and in the colon there were a number of wart-like excrescences. In 1832, Wagner, in his description of the manner of healing of dysenteric ulcers, noted that sometimes on the margins of the scars and on the healed surface of the smooth cicatrix of the healed ulcer, tiny polypoid excrescences were found. In 1839, Rokitansky confirmed Wagner's observation and claimed that these small polyps had their origin from islands of the mucous membrane that remained after the ulcerative process had ceased. Later on he described the formation of polypoid growth from the ragged margins of the ulcers. In 1861, Lebert described a case in a young woman who had suffered for years from an obstinate diarrhea. At section, the mucous membrane of the colon was found beset with hundreds of little polypi, varying in size from a lentel to a bean, some pedunculated, others sessile. He described these polyps as consisting of fibrous tissue containing ramifying blood vessels but no glands. Glandular tubules were however to be found surrounding the base of the polyps. These tubules appeared normal. In the same year, Luschka described a colon containing on its mucosa thousands of polyps from the ileo-cecal valve to the anus, varying in size from a hemp seed to a bean. Microscopically, they consisted of glands resembling those of Lieberkuhn, except that they were longer, many of them more or less branched and some of them dilated into cyst-like spaces. The mucous membrane between them was apparently normal. The patient was a young woman of 30 years who suffered for many years from a bloody diarrhea. In 1863, Virchow described a case and called it "Colitis polyposa cystica." In 1882, Cripps described three cases occurring in the same family (three brothers). The picture of the specimens described by Cripps is the same as described above by others. He concludes



Case 2. H.S.S. Male, age 31. Duration of illness, 6 months. Diagnosis: Extensive Colonic Polyposis and chronic Ulcerative Colitis. Cause of death: Intestinal Perforation with Hemorrhage.

that the multiple disseminated variety is extremely rare; that it seemed most common in early youth, it has a definite familial tendency, and is probably intimately related to intestinal cancer. Hanford, in 1890, reported a case of a woman 34 years old who died as a result of an acute intestinal obstruction. The autopsy



Case 3. S.D., Male, age 24. Duration of illness, 4 years. Diagnosis: Chronic Ulcerative Colitis, Rectal Stricture and Polyposis of entire Colon. Note the loss of haustral marking and the diminution in width of bowel characteristic of chronic Colitis.

revealed a colon studded with adenomatous polyps, one of which produced a stricture. Niemack reports a similar case of a girl of 12 years of age, also with a familial tendency. Daring, in 1907, collected from the literature 52 reported cases. Hewitt and Howard, in 1915, reported two cases representing the very early and the comparatively late stage of this disease. Murphy, in 1916, reported one case, and remarks, "the etiology of intestinal polypi—like that of the common wart — is shrouded in mystery: whence they come, why they go, is like the riddle of the Sphinx." Soper collected eight additional cases in 1916. In 1919, cases have been reported by Lockhart-Mummery. Struthers reports 20 cases from the Mayo Clinic in 1923. Pennant, in 1925, reports three cases occurring in one family. Erdmann and Morris in 1925, give a most detailed review of the whole subject and report two cases. Gant has treated 68 cases of recto-colonic-polyposis. Wheeler, in 1926, reports two cases.

McKenny, in the same year, reports one case. Coffey, in 1926, also reports a case and describes his detailed surgical treatment.

Benign neoplasms of the large intestines are comparatively rare, met with more frequently in men than women, seldom in infants, but not uncommon in children. Helmholtz reported five cases in children, the average being under ten years; he says that he has failed to find a single article on the subject of ulcerative colitis and polyposis in childhood. In young adults, the age period is between 20 and 35, though they may occur at any age; in size they vary from a wheat grain to that of an orange; they may be singular or multiple, soft or firm, pedunculated or sessile, the surface may be smooth or ulcerated, may be isolated or disseminated.

The etiology of non-malignant growths of the colon is not definite, but in many cases, they seem to be caused by chronic, catarrhal, tuberculous, luetic, entamebic, bacillary, balantidic or gonorrheal, cholproctitis; the constant smearing of the mucosa with an acrid, irritative discharge which usually excites cell proliferation, is probably the main factor in polyposis.

The neoplasms have been located in all segments of the small and large intestines, but they are more common in the rectum, colon and ileum. The common forms we mentioned in the beginning of this paper. The rare forms are: teratoma, myxoma, angioma, actinomycoma, gummata, tuberculoma, neoplasm, lymphadenoma and parasitism.

Adenomas may persist for years without undergoing malignant changes, but the majority degenerate into cancer in from one to seven years, depending on the patient's vitality, degree of irritation, and character of tumor; soft polyps more often undergo malignant changes than dense or fibroadenomas.

The predominant symptoms in these cases, I described early in my paper. I wish to add that in the course of the disease, there may be periods of improvements, but sooner or later, the result is progressive anemia, depletion, emaciation, intestinal malignancy or intestinal obstruction.

Treatment—Here I wish to lay stress on an early diagnosis. Bear in mind that a chronic ulcerative colitis is a potential colonic polyposis and the latter is a potential malignancy. Proctoscopic and sigmoidoscopic examinations are essential. Visualization of the colon by roentgen-ray should be made in every case of chronic ulcerative colitis, no matter what the etiologic factor might be. The radiologist should make two views of the colon, filled with the barium and after partial escape of barium. An early ileostomy will give the best results. Do not wait until the patient is in a moribund condition. Yield the ground to the surgeon early in order to do justice to yourself and your patient. When you wait until the polyposis becomes disseminated, it is as hopeless as a disseminated malignancy. Then surgery, roentgen-ray and radium therapy have all received their scars and met their Waterloo on this battle field.

REPORT OF CASES.

Case 1. The patient is a young man, 21 years of age, a student in the department of engineering, Tulane University. The history in brief is as follows: He was well until 4 years ago. At that time he was employed in an iron shop around the Industrial Canal. Of necessity, he was compelled to eat food and use milk from the negro shops in the vicinity. Shortly afterwards he noticed bleeding from the rectum. He consulted a physician who told him he was suffering from bleeding hemorrhoids and advised operation. A hemorrhoidectomy was performed. The result of the operation was a frequent discharge from the rectum of a thick, offensive, glairy, blood-tinted, mucoid substance which was responsible for tenesmus and dysenteric stools. He was treated with irrigations, stovarsol, and finally creosote by mouth in heroic doses, beginning with drops and reaching teaspoonful doses. Weakness, exhaustion and loss in weight followed without any improvement of the dysentery. He then followed the round of consultations. He came under my observation in August, 1926, and was admitted to Touro Infirmary. Stools were examined for ova or para-

sites with negative findings. On physical examination, the outstanding features were anemia, marked cachexia and emaciation. Bacillary dysentery, tuberculosis and syphilis were ruled out by negative laboratory findings. Proctoscopic examination was made which revealed the true nature of the trouble. About two and one-half inches from the anal margin numerous polypoid-like structures varying in size, and bleeding easily could be noted. The mucous membrane in spots was ulcerated. An roentgen-ray visualization of the entire colon was made and a most interesting radiographic picture of the colon was obtained. There were definite evidences of an extensive chronic colitis when the colon was filled with barium. The radiologist suggested making another visualization a little later when part of the barium had escaped from the bowel. The second radiograph revealed the honey-combing of the entire ascending, transverse and descending colons down to the midportion of the sigmoid, due evidently to extensive colonic polyposis. The entire colon was narrowed down to the size of the small intestines with complete loss of haustrations. At the spleenic flexture, the colon in width was about the size of a finger. Surgical interference was advised, but unfortunately the patient refused. Various remedies were tried without result; the use of suprarenal extract was suggested on the basis of similar treatment in cases of Von Recklinghausen's disease. Six grains per day were given, the patient seemed to improve for a short period and gained two and one-half pounds in weight, stools became normal and blood and mucus disappeared. This intermission was of short duration and a remission of the former trouble soon ensued. On January 13, 1927, another roentgen-ray of the colon was made and the same condition as previously described was found. At this examination, there was some extension of the polypoid growth, as it appeared to be more extensive than when previously examined. The patient at last realizing the hopelessness of palliative medical treatment, consented to an operation. An ileostomy was performed. The patient seemed to rally very quickly after the operation, he began to gain in weight rapidly and his general condition improved greatly. But even this ray of hope soon vanished, abdominal pain developed and frequent bloody rectal discharges reappeared. His hemoglobin at this time was around 25 per cent and a blood transfusion was done. For a few days after the transfusion, he seemed to sink very rapidly, was not able to take nourishment on account of abdominal pain which would come on immediately after solid or even liquid food and the bloody rectal discharge was very exhausting to him. Reasoning that the upper abdominal pain was probably due to a reflex pylorospasm, he was put on belladonna and bromids and the use of suprarenal extract was again instituted. His improvement under this plan was rapid; he is able to take five meals a day and sit up in a chair. A specimen with a snare through the proctoscope was obtained for pathological examination. The laboratory report reads: "Benign adenomatous type." The prognosis in this case is poor; the surgeon does not believe that the next radical step, that is colectomy, can be undertaken unless the patient regains a fair state of health.

Case 2. Mr. S. The patient was admitted October 6, 1926, and died December 20, 1926. Three months before admission to hospital, the illness began with diarrhea, bloody stools, cramps, tenesmus. He has been having 12 to 15 stools daily, each mixed with bright red blood; blood clots were often passed; often passages consisted only of blood. He was treated previously with various medication, but nothing was found to check the diarrhea or loss of blood. He has lost 15 pounds; appetite was good; no cough or other respiratory symptoms were noted; there were no chills or night sweats.

Examination: The patient was emaciated; there were depressed supra-clavicular spaces, dullness over right apex, no rales, no abnormal breath sounds. Barium enema showed narrowing of lumen and faulty arrangement of haustral markings with some irregularity. "These are changes commonly associated with ulcerative colitis." Proctoscopic examination showed extensive ulcerated areas with fibrotic changes, no polyps. No ameba were found. During his stay in hospital his temperature was septic, with afternon rises and marked drops in the morning. Temperature fluctuated between 102° and 97°, pulse between 100 and 120. There were no sweats or chills. He became progressively worse, diarrhea continued, blood in stools was present almost constantly, he lost weight considerably, emaciation and anemia became marked. Roentgen-ray of chest showed evidence of infiltration. Dr. Lyons who saw the patient in consultation reported that he considered this as evidence of an old, probably inactive, pulmonary lesion. Three weeks after admission the patient developed multiple inflammatory fistulae; smears from fistulous tracts were negative for acid fast bacilli. Dr. Maes believed fistulae were suggestive of tuberculosis. Surgical intervention was considered and appendicostomy was performed. Aside from a few enlarged mesenteric lymph nodes, the region explored (ascending colon), showed no involvement. The wound did not heal and a fecal fistula formed. Evidence of sepsis became marked; transfusion of 500 cc. of whole blood was given. Within a few days the patient began having hemorrhage, with blood es-

caping from wound and anus, becoming progressively worse, and died.

Pathologist's report: Post mortem examination revealed the following outstanding features: Apices of both lungs were adherent, there were no definite evidences of pulmonary tuberculosis. Heart was normal, liver was enlarged with definite evidences of fatty degeneration. Kidneys and spleen showed some secondary changes. Gastro-intestinal tract — the large bowel was found extensively ulcerated with a large perforation of one of the ulcers in the upper part of the descending colon. The ulcers were undetermined, typical of amebic ulcers; smears were made from the ulcers and stained specimens were examined for ameba with negative findings. The ulceration was not tuberculous nor luetic. The entire mucous membrane was studded with masses of polypoid tumors, some as large as a grape. Dr. Lanford states that a smear from the ulcer and a stained specimen showed a fungus, possible trichophytic; this would be a most unusual causative factor and opens up a new field for study of chronic ulcerative colitis.

Case III. F. D., aged 19, was admitted February 17, 1926, and discharged October 29, 1926. The patient has been having loose bowels for past three and one-half years, stools were watery, averaged 10 to 14 in 24 hours, some mucus and blood in the stools. He did not have a solid stool since onset of illness. His condition became progressively worse. For a period of three years numerous drugs were tried without any relief. Ipecac pills, stovarsol, emetin and irrigations, were of no avail. Proctoscopic examination showed a well organized stricture about two and one-half inches from the anal margin; above the stricture, the mucous membrane was ulcerated and very friable. Examinations for ameba were negative. Tuberculosis, syphilis and bacillary dysentery were ruled out by negative findings. Physical examination was negative. Gastric analysis showed free HCL 28, total 44. Blood picture showed secondary anemia. Urine was negative. Radiological report of colon reads as follows: "Entire colon is converted into a smooth walled tube, no evidence of haustration visible at any location." Diagnosis: Chronic colitis of long standing. During his stay in the hospital, numerous remedial measures were tried without any satisfactory results. Among measures tried were:

Milk diet; acriflavin irrigations (3 gr. to the gal.), mercurochrome irrigations (1 per cent), large doses of bismuth sub-nitrate, mixed treatment, neo-salvarsan, treparsol, and finally an attempt was made to isolate the bargan diplococcus and autogenous vaccine was given, with very little improvement. He left the hospital on Oct. 29, 1926, still having from 6 to 8 stools in 24 hours. He returned to the clinic on January 10, 1927, almost in the same shape as he was a year ago. Roentgenogram of the colon was made and the following is the radiologist's report: "Colon has lost its haustral markings throughout and very pronounced evidence of colonic polyposis is visible. This involves the entire colon from caput coli to rectum. There is also an incompetent ileocecal valve. This patient is of unusual roentgen interest." He was advised to re-enter the hospital and submit to surgical intervention. So far he has steadfastly refused.

The radiologist of the Touro Infirmary was kind enough to show me a radiogram of a fourth case in which the greater part of the ascending colon is evidently studded with polypoid growth.

A fifth case is under my observation at Touro Infirmary. This patient is suffering from chronic amebic ulcerative colitis. Every form of treatment for amebic dysentery was tried without any relief; appendicostomy was recently done, but the escape of blood and mucus from the bowels continued. Proctoscopic examination made by me three days ago reveals a definite beginning of polyposis of the rectum.

I am indebted to Dr. B. G. Efron of the Interne staff of Touro Infirmary for his collaboration in working up these cases and to Miss Isom for the drawings.

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REVIEWS

DISTURBED PHYSIOLOGY IN NEPHRITIS: A REVIEW.

HYDER F. BREWSTER, M. D.,
NEW ORLEANS.

The term nephritis being, in itself, a rather vague noun, a definition is necessary to make clear and to render limited, its application in this paper. In the discussion which follows, nephritis will be understood to mean a diffuse, but not necessarily universal, progressive, degenerative or proliferative lesion involving the renal parenchyma, the interstitial tissues or the renal vascular system. Both degenerative and proliferative lesions are usually seen but one type will predominate more or less over the other and thus justify such nomenclature. Also, parenchymatous, interstitial and vascular lesions are present in the same specimen, but the predominance of one type of lesion justifies such pathological divisions.

However, in spite of the enormous amount of very careful work which has been done, we cannot as yet correlate disturbances of renal function with the observable anatomical and pathological changes. The greatest changes do not always correspond to the locality of the greatest impairment of function; these facts lead to the belief that there are less conspicuous but more important intracellular and intercellular changes which are as yet unrecognized.

For the clinician, then, it is far better that he should, with our present knowedge, study and think of nephritis in terms of disturbances of renal function, *i. e.*, in terms of disturbances in the excretion of substances normally eliminated by this organ. The basis for such a point of view is readily found when we recall that all rational therapy and certainly all prognoses of value are based upon the functional status of the kidneys.

Besides disturbances of physiology directly and immediately associated with disturbed renal function there are by-effects or secondary disturbances of normal physiology which must be considered in their proper places.

Among students of medicine there should be no necessity of emphasizing the importance of nephritis as a disease. N. B. Foster[1] places it fourth among the causes of death in the United States, being excelled only by cardiac disease, pneumonia and tuberculosis respectively. In fact, as defined in this paper, nephritis is a definite clinical entity of such common incidence and such grave potentialities that, no matter what branch of medicine one may enter, he will always be confronted with its problems.

HOW THE KIDNEY FUNCTIONS.

The mechanism or method by which the kidney is enabled to excrete an acid urine of much greater molecular concentration than the alkaline blood plasma, and with a modified ratio between its various crystalloids, and which does not contain sugar nor plasma colloids, has been a subject of much speculation and experimentation. The more recent work by Wearn and Richards[2] seems definitely to establish as a fact

Cushny's hypothesis of this mechanism; that is, at the glomerulus there occurs a simple filtration of all substances of the blood except the formed elements and the plasma colloids, and in the tubule there occurs a differential absorption of all threshold bodies as water, glucose and sodium chlorid up to certain physiological or threshold requirements; the urea, uric acid, creatinin, creatin, phosphoric acid as sodium acid phosphates, etc., continue the journey from the glomerulus as constituents of the urine. There is evidence that certain solid substances as hemosiderin pass through the tubular epithelium to reach the uriniferous stream. Also there is some suspicion that uric acid and phosphoric are further added to the urine by passing through the tubular epithelium.[3]

KIDNEY FUNCTIONS AND THEIR DISTURBANCES IN NEPHRITIS.

The functions of the kidney (4) are:

I. To eliminate nonprotein nitrogenous wastes.

II. To maintain a proper fluid balance.

III. To secure a proper salt balance, especially sodium chloride.

IV. To assist in maintaining alkalinity of the body fluids.

V. Possibly to eliminate certain toxic substances as yet little known.

I. THE NITROGENOUS WASTES.

Catabolism of ingested proteins or of body tissues results in the production of non-protein nitrogenous bodies as urea, uric acid, creatinin, creatin and certain unknown nitrogenous bodies at present called residual nitrogen; the percentage proportion of the latter rises in nitrogen retention and the significance of this will be discussed later. These substances are present in the blood of the normal person in relatively fixed or constant quantities and are excreted by the kidney in quantities proportional to their amounts present in the blood. It is thus seen that these nitrogenous bodies are not threshold substances and are, therefore, not reabsorbed by the tubules.

In nephritis these substances may be excreted normally or their excretion may be slightly impaired, moderately impaired or there may be almost total retention. Since there is knowledge to explain only those types of retention due to oliguria or anuria (most frequent in acute nephritis), the purely theoretical explanations offered for other cases will not be discussed. Nitrogen retention may or may not occur in any form of nephritis; in acute nephritis it is absent or slightly present unless more or less anuria obtains or uremia supervenes; in subacute nephritis with edema, the retention is usually slight; if retention occurs in hemorrhagic nephritis it is moderate; in chronic nephritis it is usually small in those cases with edema; in chronic nephritis with hypertension and no edema there is nearly always, sooner or later, marked retention, the total non-protein nitrogen going up from its normal level of 28-30 mg. to 200-300 mg. or more; in essential vascular hypertension leading to nephritis, retention is slight until relatively late; in the arteriosclerotic kidney, retention is rarely a factor of note. In the more fulminating or terminal stages of these types of nephritis, the above statements may not hold.

Normally the urea nitrogen forms 50 per cent of the total non-protein nitrogen, but in retention this level rises to 60-85 per cent or more. Urea, being readily diffusible throughout the body, probably gives some of the symptoms of uremia.

What is the relation of nitrogen retention to other renal functions? There are no constant relationships. There may be marked albuminuria, edema and retention of chlorides with no retention of nitrogen. There may be marked nitrogen retention and little or even no albuminuria, edema or chloride retention. The relation to high blood pressure is inconstant; if there be

much retention the pressure will usually be elevated; there may be high blood pressure with no nitrogen retention. As nitrogen retention goes up phthalein excretion decreases; there are a few exceptions to this but where the parallelism is markedly altered, always suspect and look for cardiac insufficiency.

II AND III. WATER AND SALT BALANCES

Both water and sodium chloride are threshold substances and are reabsorbed from the tubules until the physiological or threshold levels are reached. If an increased quantity of these substances be ingested by a normal person there occurs an immediate proportional increase in their output; also if greatly reduced quantities be ingested there occurs a proportional decrease in output; thus a delicate and constant balance is maintained.

In Christian's[5] classification of nephritis those forms showing edema are the types in which the equilibrium of water and salt is disturbed. This is not invariably true as there are a few cases in which there is rather marked salt retention without any edema; in these cases the salt is thought to be combined in the tissues as the latter may contain twice the normal amount. Chlorides tend to be retained in acute nephritis with edema but the salt retention is much more marked in subacute and chronic nephritis with edema; thus it is seen that water and salt balances are very closely related. The usual type of nephritic edema is that in which there is primary retention of sodium chloride with secondary retention of water. No satisfactory explanation of primary sodium chloride retention has been found; suggestions have been damaged renal cells, increased permeability of vessel walls, abnormal tissue affinity.

Water retention from whatever cause practically always initiates secondary salt retention which may further augment the edema. Those minority edemas in which water retention appears primary have many proposed explanations. Two of these merit mention here as they have experimental and clinical evidence in their support. Leo Loeb[6] and others have shown that lesions of the glomeruli may be sufficiently severe and universal to give rise to diminished total glomerular filtration; it must be remembered, however, that there is no constant clinical relationship between apparently severe glomerular lesions and renal edema. Epstein,[7] early disputed by some but more recently confirmed by Van Slyke, states that especially in chronic nephritis with edema, where albuminuria is frequently heavy, the blood colloids are greatly reduced by loss of serum albumin through more permeable glomeruli; the globulin being held back, its relative proportion in the plasma rises. The refractometer in these cases reveals greatly reduced serum or plasma colloids and experiments show that the normal reserve colloid osmotic pressure of 30 to 35 millimeters of mercury is greatly reduced; this diminished osmotic pressure in the blood vessels is supposed to allow the water to escape into the tissue spaces. An increase in the permeability of the vessel walls is a third explanation offered to explain so-caled primary water retention.

Of course in some cases of acute nephritis and in acute exacerbations of chronic nephritis the whole kidney swells to such an extent and the capsule becomes so tense that the circulation of blood through the kidneys is greatly reduced with a resultant marked diminution in the urinary output. These are the cases in which decapsulation or nephrotomy may be of value.

Albuminuria occurs in nearly all cases of nephritis but the largest quantities usually occur in subacute nephritis with edema and in chronic nephritis with edema. Whether there is any significance in this coincidence other than that suggested by Epstein remains to be proven. Mayrs[8] states that the protein of ordinary nephritic albuminuria is largely serum albumin de-

rived unchanged from the plasma by its passage through the glomeruli.

Other features of the water-salt complex will be considered under renal function tests.

IV. THE ALKALI BALANCE.

The carbonic acid formed by the combustion of carbon containing compounds and the organic acids formed in normal but especially in abnormal metabolism, as in diabetes, do not concern the present discussion. Here sulphuric and phosphoric acids, formed by the oxidation of protein compounds containing sulphur and phosphorus in organic combination, chiefly concern this paper; of these, only the latter in the form of acid phosphates need be thought of as it is the chief offender in nephritic acidosis. Until recently this conception has not been seriously contested; of relatively recent date, however, Bulger[9] has, by his experiments, raised the contention that an increase of undetermined acids plays a very important part in the genesis of nephritic acidosis. Whether this be true or not, it is known that in nephritis, especially in chronic nephritis without edema and in chronic nephritis with edema if uremia supervenes, a retention of acid phosphate takes place; why, no one can say. With retention of phosphates there occurs a decrease in plasma calcium; this latter factor may play a part in the convulsions and tendency toward hemorrhage observed in many of these patients.[10]

Acidosis in nephritis tends to parallel nitrogen retention and therefore diminished phthalein excretion; this is not invariable as was shown by Denis and Minot.

Nephritic acidosis does not often become severe, though sometimes the condition may be demonstrated by a decrease in alveolar carbon dioxide tension and in carbon dioxide combining power of the plasma as well as by the appearance of air hunger. Sellard's[11] clinical test will be mentioned later.

V. THE UNKNOWN TOXIC BODIES.

The fact that in many cases of nephritis, especially in cases showing nitrogen retention or those in which uremia threatens or develops, there occurs an increase in the proportion of residual or undetermined nitrogen; the suspicion has long existed that in some cases of acute nephritis but especially in chronic nephritis more particularly without edema, there appears in the blood certain toxic nitrogenous substances which play a part in the genesis of uremia and possibly in the hypertension of nephritis to be mentioned later. Evidently these substances may originate in normal metabolism and are not excreted or may be formed in a perverted metabolism and not excreted. In different cases of uremia varying proportions of the symptoms are given by edema of special organs, by urea or its kindred bodies. All the symptoms of uremia cannot, however, be explained on the above basis.

Following similar lines of reasoning, N. B. Foster[12] defined uremia as an intoxication manifested by psychomotor disorders, which is apt to supervene in nephritis; and classified his cases of uremia on a symptomatic basis as follows:

1. Convulsive or epileptiform type.
2. Cases with gradually deepening coma with no psychic disorders or signs of motor irritation.
3. Cases showing psychic disorders, hallucinations and paranoid delusions.

In all twenty of his cases[13] of convulsive or epileptiform uremia he isolated a toxic base from the blood which when injected into laboratory animals reproduced the symptoms of motor irritation and in many cases killed the animal. In the convulsive type of uremia there may often be little or no retention of known nitrogenous bodies. Uremia most frequently supervenes, however, in cases of rather marked nitrogen retention and in these caess there is decreased phthalein

excretion and acidosis is most apt to occur here. Uremia may occur in cases with little or no retention of known nitrogenous bodies and still not fall in the convulsive group.

OTHER DISTURBANCES OF PHYSIOLOGY.

Basal Metabolism.—Basal metabolism is rarely changed in acute nephritis. In subacute and chronic nephritis with edema it is usually low but may be normal; while in chronic nephritis with hypertension the basal metabolism is usually high, though it may be normal but never below normal. The causes of these changes in basal metabolism have not been satisfactorily explained. The above is sufficient, however, to emphasize the fact that nephritis is usually more than a local affection at least after it is well estabished.

Hypertension.—Blood pressure is often elevated in chronic nephritis, less often in acute nephritis. Where an elevation of blood pressure occurs in acute and chronic nephritis with edema it is very likely due to a generalized vasoconstriction resulting from the action of some toxic agent as the pressure resumes its former level when the nephritis abates. Increase in blood pressure is more frequent and more marked in chronic nephritis without edema, and in these cases it is very likely due to a general and very fundamental causative process which itself may be responsible for the nephritis.

Secondary Anemia.—Secondary anemia is a frequent finding in nephritis. It is usually mild in acute nephritis, but may be severe in chronic nephritis, especially chronic nephritis without edema. This anemia cannot be accounted for on the basis of hematuria; it is the result of a toxic action on the hemopoietic system by substances not well known.

Hyperglycemia.—The not infrequent increase in blood sugar and less frequent occurrence of glycosuria in some cases of subacute and chronic nephritis would be explained by O'Hare on the basis of vascular sclerosis in the pancreas giving rise to inadequate function of the isles of Langerhans.

DETECTION OF DISTURBED RENAL FUNCTION.

Blood Pressure.—Blood pressure should never be neglected in nephritis or those suspected. Some early cases may be first detected by this method when no other signs or symptoms have occurred.

Weighing the Patient.—This is important when it is recalled that a patient may gain 12 to 15 lbs. in weight before clinical edema becomes evident. Weighing is also important in determining the success or failure of therapeutic measures.

The Phenolsulphonphthalein Test.—This test is sufficiently familiar to all. A decrease in the excretion of this dye usually parallels the increase in total non-protein nitrogen of the blood, though there are a few exceptions. No single test is of much importance—the general trend is valuable. It must be remembered that the excretion of this dye is greatly decreased by passive congestion of cardiac origin, and unless the above parallelism obtains, suspect this condition. Cyanosis of whatever origin, results in low phthalein readings due to alterations in the dye itself. In chronic nephritis with this test constantly below 15 per cent a bad prognosis is justified. There are rare exceptions to this statement.

Sellards' Test for Acidosis. — Five grams, or slightly more, of sodium bicarbonate will, when given orally, render the urine of a normal person neutral or alkaline. If more be required, then acidosis is said to be present though no thought need be directed to this unless 10 grams or more be required.

Determination of Total Non-Protein Nitrogen of Blood.—This is the most valuable single test of renal function. Not only is it diagnostic, when retention due to congestion of cardiac origin is ruled out, but it is of the greatest value in determining therapeutic measures to be employed. By it the obstetrician performs his thera-

peutic abortions, the internist initiates special diets, while the surgeon determines his operative risks. The greater the retention of nitrogen and the more refractive it is to dietary methods, the worse the prognosis.[14]

It is only in connection with this test that I claim to have done any personal work in the preparation of this paper. Following the method introduced by Hench and Aldrich,[15] it is found that the normal titratable mercury combining power of 100 c.c. of deproteinized blood is 70 to 100 c.c. of 5 per cent aqueous bichloride of mercury. This titration value varies directly as the quantity of total non-protein nitrogen. More work is necessary before a mathematical formula, for calculating the nitrogen in milligrams, can be introduced. With the present state of development, one can in 15 to 20 minutes, determine whether there is mild, moderate or marked retention of nitrogen. Obviously this test is well worth learning. It can be carried out with almost the same facility with which we determine the quantity of sugar in urine.

There are various types of concentration and diuresis tests with and without special diets that should be employed in suspected earlier cases.

SUMMARY.

The disturbances of physiology in nephritis cannot yet be correlated with the most obvious pathological and anatomical changes found in the kidneys. These changes or alterations of physiology concern, primarily, defects in the excretion by the kidney of substances normally eliminated by this organ by a process of filtration at the glomerulus and of differential absorption in the tubules. There is no orderliness in association of these defects of function. Besides these primary alterations of function there are other disturbances of normal physiology such as an increase in blood pressure, anemia, hyperglycemia and changes in the basal metabolism, all giving to nephritis an atmosphere of a general as well as a local affection.

There are several methods for detecting the various departures from normal function; each possessing its own application and value in particular instances.

Some problems, as reduction of plasma colloids, and ordinary or special toxic bodies, are still under dispute.

CONCLUSIONS.

1. The clinician must study nephritis from the standpoint of altered functions and not from the point of view of the pathologist.

2. There are no constant relationships between alterations of different functions.

3. Each case must be handled on its own merits as revealed by tests of renal function.

4. Some therapeutic measures may be suggested by determining the quantity of plasma colloids by the refractometer.

5. In some instances nephritis takes on the aspects of a general affection.

6. An inevitable conclusion is that there are many things encountered in a study of nephritis concerning which little is known.

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CASE REPORTS AND CLINICAL SUGGESTIONS

SOME POINTS IN THE MANAGEMENT OF LABOR.*

ELLIOTT KIBLINGER, M. D.,
NEW ORLEANS.

I have but two points to which I desire to call your attention, and I feel they are of sufficient practical importance to you for the time and attention required to tell you.

A PRACTICAL AND INEXPENSIVE METHOD OF HAND STERILIZATION.

For a dime or a quarter a can of ordinary bleaching soda or chlorinated lime can be purchased. This is easily obtained, easily carried, and is a rapid, sure disinfectant and sterilizing agent. The way it is used is as follows: Place a tablespoonful in the palm of the hand and then pour sufficient water on to form a thick paste. Rub this paste all over the hands and leave in contact with skin surface a few minutes. Chlorinated lime and water generate pure chlorine gas. Of course, it is presumed that before applying this lime paste the hands have been given a thorough scrubbing with soap and water, using a nail brush.

Obstetrical surgery differs from other surgical procedures in that we can not always elect the place to operate. Many labors must necessarily be attended under adverse aseptic conditions; hence, any method of hand sterilization which is sure and easy to secure is worth while. I do not claim anything original in this method for I learned it from Dr. Alexander B. Johnson of Columbia University, New York, but I do claim that years of trial of this method have proven all one could wish in that it prevents sepsis and practically does away with the enormous morbidity of child birth.

A METHOD OF RELIEVING PAIN CONNECTED WITH CHILDBIRTH WITHOUT ANY UNTOWARD EFFECT ON THE MOTHER OR CHILD.

This suggestion consists of a modification of the old twlight sleep to which is added the use of pituitrin.

I dissolve 1/100 grain (.65 mg. of hyoscin hydrobromid and ¼ grain (.015 gm.) of morphin in a hypodermic syringe full of distilled water, then I fill another syringe with the contents of one ampule of pituitrin. At intervals of 30 minutes to one hour, some patients responding more readily than others, I inject 0.3 cc. from each of the syringes. After the third dose of each of the hyoscin and morphin solution and the pituitrin I find the patient having regular and strong pains, and as soon as the pain passes, the patient immediately goes off to sleep to be awakened by the next pain. The sleep between the pain is peaceful, natural and sound. In the past the mistake has been to use too large doses of both hyoscin and morphin and pituitrin, resulting in the mother's pulse going up to 140 or 160 beats per minute and a blue or dead baby. This brought twilight sleep, so-called, into merited disrepute. But if the drugs are given in doses as suggested they are harmless and do away almost entirely with hours of suffering, fretfulness and loss of courage which most women in labor experience.

The patient receives only about 1/24 grain (.0015 gm.) of morphin every one-half hour and only 1/600 of hyoscin (.1 mg.). I regulate the dose of each according to the effect I obtain. The pituitrin produces regular and strong pains and the hyoscin and morphin solution a practical, safe and sane pain relief.

The only objection I have found is that it requires on an average of two hours longer time to complete the labor. But is this time not well spent if we can secure for our patients practically a painless labor? Also, this extra time allows nature time to prepare the parts for the passage of the head without a tear of the birth canal.

506 Medical Building.

*Read before the Orleans Parish Medical Society, May 23, 1927.

NEW ORLEANS
Medical and Surgical Journal

Established 1844

Published by the Louisiana State Medical Society under the jurisdiction of the following named Journal Committee:

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SUBSCRIPTION TERMS: $3.00 per year in advance, postage paid, for the United States; $3.50 per year for all foreign countries belonging to the Postal Union.

News material for publication should be received not later than the twentieth of the month preceding publication. Orders for reprints must be sent in duplicate when returning galley proof.

THE JOURNAL *does not hold itself responsible for statements made by any contributor.*

Manuscripts should be addressed to the Editor, 1551 Canal St., New Orleans, La.

DR. THOMAS E. WRIGHT.

Dr. Thomas E. Wright died at his home, "The Cedars," in Monroe, Louisiana, July 5, 1927. While an attack of influenza last spring had left him with lowered vitality yet he had fulfilled all the obligations of his large practice and continued to give generously of time and service to the many civic movements in which he was interested.

Dr. Wright, a native of Lincoln Parish, was born September 8, 1876, near Choudrant and as a youth attended a small college at that place. He was graduated from the State Normal College and was principal of the high schools at Simsboro and Boyce.

Dr. Wright entered Tulane Medical School in 1906 and received his diploma in 1909. Soon after his graduation he became associated with the State Board of Health in the hookworm survey then being made in many parishes of Louisiana. In 1917 he became a member of the State Board of Medical Examiners appointed by Governor Pleasant and served as Vice President of that Board from 1917 to 1923. In 1925, he was appointed by Governor Henry L. Fuqua a member of the State Board of Health. Dr. Wright was identified closely with the purposes of the Board and at all times was an enthusiastic supporter of its activities. During the meeting of the Legislature in 1924, Dr. Wright gave unselfish, intelligent and constructive effort for needed health legislation. He worked for the passage of the tax on kerosene with the understanding that the income derived from this source would be used by the State Board of Health for the most outstanding features of public health work including the extension of full-time health service for the parishes, the payment of losses incurred by individual owners of tubercular cattle reactors and the tuberculosis programs of the Board. He believed strongly in all of the Board's efforts for public education.

Dr. Wright had a keen interest in certain phases of research and was a pioneer in experimentation with the intravenous use of quinine in acute malarial conditions. In this original field he was successful and the method he advocated is now used by physicians throughout the continent. He was honored with a medal for original research by the Fifth District Medical Society and was presented with another medal for research work by the Tri-State Medical Society of Louisiana, Arkansas and Texas.

Dr. Wright was an earnest and faithful member of the American Medical Association, the Southern Medical Association, the Louisiana State Medical Society, the Ouachita Parish Medical Society and the Fifth District Medical Society.

On June 29, 1902, Dr. Wright was married to Miss Claudie Trussell of Simsboro.

A few years after their marriage Mrs. Wright died leaving one son, Edwin Gordon Wright. Later Dr. Wright married Mrs. Robert Layton, who survives him.

Dr. Wright stood steadfastly for the high ethical ideals of the medical profession to which he was devoted. He was a man of firm faith and kindly deeds; he was active in all plans and movements which implied civic development and greater opportunity for the individual. He believed that health is fundamental to civic and personal progress. Dr. Wright will be missed by his confreres, his other friends and by the community and State. His deeds need not be graven in stone for they will live in the hearts of men.

HOSPITALS AND CLINICS OF NEW ORLEANS.

The Central Council of Social Agencies is to be congratulated upon the very efficient study that has been made of the fifteen hospitals and clinics in New Orleans. The reason for the study lies in the fact that of the five and a half million expended for social welfare in New Orleans, nearly seven-tenths of this amount was spent by the hospitals and out-patient departments. The administration of development of these hospitals and clinics presents a community problem. Sometimes it is extremely difficult to elucidate and at best to secure the proper spending of this large sum of money.

In presenting this report, the Committee is able to contrast studies which have been made in fifteen other cities, and to compare them with New Orleans. It might be well to mention some of the outstanding features of the report. It has been found that in New Orleans approximately one-third of the hospital patients are non-residents. Of these non-residents, the majority of them come from the surrounding country, but a certain few are brought in by ships from foreign ports. The study of the finances of the hospitals is of some interest. New Orleans spends per capita $4.91 and of this money over sixty per cent of it comes from the self supporting income of the hospital. Thirty per cent comes from governmental funds, and ten per cent is contributed by private subscription. The resident population of the City of New Orleans has available 6.38 beds for every thousand of population. There are only two large cities showing larger proportionate number. New Orleans stands fourth in the per capita number of patients served. In the days of care New Orleans is fifth. However, when it comes to degree of the use of beds, New Orleans is away down the list, only 62.4 per cent of the hospital beds being occupied at any one time. There are 2,667 hospital beds for use in resident service in New Orleans, of which 1,666 are entirely free and 840 which are free for pay beds in whole or in part. In the percentage of free work done in New Orleans hospitals as contrasted to hospitals of other cities, it is found that this city stands first. Over seventy per cent of the total days of care in New Orleans are given free.

It is frequently said that there are not sufficient beds for colored patients in the city. But this is not so, as shown by the study which proves that the number of beds per thousand available for the colored population is 6.06; that of the white 6.48. However, there are practically no pay beds for the colored race in the city.

The study of the clinics deserves particularly to be accentuated. New Orleans ranks second in per capita dispensary expense. The number of new patients cared for in the out-patient departments in New Orleans far out-ranks any other city from which figures are available. The same thing applies to the per capita clinic visits.

The conclusions drawn from this work should be studied carefully by every physician and everyone interested in economic and social problems. It shows definitely that the general hospital beds in New Orleans are over-supplied, although there is

a tremendous need of beds for tuberculous patients, for communicable diseases for which there are only some thirty available, and for maternity cases. This observation is of tremendous importance. It is talked from time to time the formation of additional hospitals in the city. Certain special hospitals may be needed, but it would be a waste of money to build and construct additional general hospitals. One of the outstanding developments of the study is the exceedingly high rank of the city in clinic dispensary service. The goodly part of this comes from the high percentage of free work given to the colored. However, one can not deny that a great deal of the service given at clinics is given to individuals who have sufficient means to pay for the services and yet are willing to accept the services of the physician and to pauperize themselves by accepting generously of contributions to hospital funds.

It is impossible to give all the salient features of this valuable and interesting report. Only those which are particularly interesting to the medical man have been accentuated. However, it would be advisable for the medical profession to acquaint themselves with the details of the study.

POST-FLOOD HEALTH MEASURES.

We note with considerable pleasure the timely, important and urgent warning embodied and published in the New Roads "Parish Courier Journal" of June 9, 1927, a resolution adopted by the Pointe Coupee Parish Medical Society in joint conference with the Parish Board of Health.

The resolution urges prompt vaccination against smallpox and typhoid, offering to vaccinate free of charge where necessary. It stresses the necessity of careful attention to the sanitary conditions in the recently inundated areas, advising drainage of all stagnant pools, whitewashing, and a general clean-up campaign. Then the importance of a proper supply of drinking water is stressed; boiling of all water except that from artesian wells being considered absolutely essential. Finally, a suggestion that all cases of chills and fever have a blood smear made before any quinine is given; and a warning against charbon and rabies.

The necessity of such medical advice and warning is perfectly apparent, and we feel sure that the Parish Society has acted wisely and well. The Society and the committee is to be congratulated upon its efficient handling of such a matter. This program as outlined, if followed carefully and thoroughly, will do much to preserve the health of the population of the entire State, and prevent the dreadful scourge of epidemics, which are certainly very likely to occur unless preventive measures, such as these, are observed.

TEN YEARS OF BOVINE TUBERCULOSIS WORK PUTS CAMPAIGN ON POPULAR BASIS.

While more than 1,000,000 dairy cattle, out of 30,000,000 head tested for tuberculosis, have been destroyed, the industry is in better condition today than it was ten years ago when the campaign against the disease was inaugurated. Such was the opinion expressed by Dr. John R. Mohler, chief of the Bureau of Animal Industry, United States Department of Agriculture, at the recent Eastern States Tuberculosis Conference.

Fear expressed by many people in the beginning that the campaign would turn the public taste against milk consumption has proved to be unfounded, according to Doctor Mohler. On the other hand, he said, the annual consumption of milk in the United States has increased more than 49 quarts per capita since 1918. During 1926 the public consumed 56 billion pounds of milk and cream, an increase of 2 billion pounds over the quantity consumed in 1925.

TRANSACTIONS OF ORLEANS PARISH MEDICAL SOCIETY

July is the beginning of the summer recess of the Society.

Aside from the regular meeting of the Board of Directors the Society has held but one meeting in the form of a Second Quarterly Executive Meeting.

The questionnaire relative to group insurance for members of the Society has been coming in very slowly. To date only 175 members have signified their intention of subscribing to this insurance. A second questionnaire has been sent out to the members which they are urgently requested to fill out and return to the office of the Secretary so that at the first Fall meeting this question of group insurance may be definitely disposed of.

The Board of Directors has recommended the holding of a Memorial Night sometime in the early Fall in memory of the late Dr. Frederick W. Parham. Full details of this meeting will be furnished the membership as soon as completed.

A dinner in honor of Dr. Rudolph Matas on his return from his tour of Europe is to be held. A special committee, with Dr. Paul J. Gelpi as Chairman has been appointed to complete arrangements.

The Board of Directors and the Society in open meeting have approved the plans of a Committee on Crippled Children of the Central Council of Social Agencies. This Committee is composed of all of the Orthopedic Surgeons in this city and many of the Social Service Workers under the Chairmanship of Mr. Nicholas Bauer, Superintendent of the New Orleans Public School System. This Committee plans to develop a program whereby a complete census of crippled and physically defective children in the Parish of Orleans will be obtained, and through publicity it is hoped to impress the parents of those children who have had no medical attention with their responsibility. Through the facilities now available it is hoped that these children will receive proper treatment.

Drs. Clifford J. Vedrenne and Leonhard E. Devron were elected to Active Membership in this Society.

Drs. Henry Laurens and Henry L. Meyer were elected to Associate Membership in this Society.

At the Quarterly Executive Meeting an interesting paper was read by Miss Mary Louise Marshall, Assistant Librarian, on her recent visit to the Annual Convention of the Medical Library Association which was held in Washington, D. C.

Dr. M. F. Wilson showed interesting moving pictures on the preparation of vaccines and serums in the Parke-Davis & Company Laboratories.

Dr. B. R. Heninger and Dr. L. W. Alexander have resigned from the Society on account of changes in their residence to another State.

The following resolutions proposed by the Condolence Committee, Dr. Daniel J. Murphy, Chairman, were adopted at the quarterly Executive Meeting:

"Whereas, God in His Wisdom saw fit to remove from us by death Dr. Percival Butler McCutcheon, Dr. Frederick William Parham and Dr. Florena Gates Rich, Members of this Society,

"Be it Resolved; that the Society extend to the families of the deceased its condolence and profound sympathy in their bereavement.

"It is further recommended that a copy of these resolutions be sent to the families of the deceased."

All members changing their addresses will kindly notify the Assistant Secretary so that the mailing files may be corrected.

There will be no further meetings of the Society until the first meeting in October, which will be Monday, October 10th, 1927.

The Membership of the Society is 482.

REPORT OF THE TREASURER.

Actual Book Balance, 5/31/27	$ 988.58
June Receipts	551.73
Total Receipts	$1,540.31
Expenditures	513.81
	$1,026.50
Outstanding Checks	30.00
Actual Book Balance, 6/30/27	$1,056.50

REPORT OF LIBRARIAN.

The Library has been in constant use during June—in spite of the warm weather. Most of the calls were for immediate Reading Room use.

One bibliography has been added to our files, on Surgery of the Mitral Valve.

Gifts have been received from Montefiore Hospital, New York; Iowa State Medical Library, California University Medical School Library, St. Louis Medical Society, T. J. Dimitry, Jefferson Co. and University of Louisville Medical Library.

94 books have been added to the Library during June. Of these 49 were received by binding, 28 by gift, 7 by purchase and 10 from the New Orleans Medical and Surgical Journal. A notation of titles is appended.

New Books—June.

Annals of Medical History, v. 2-8, 1919-26.

Levinson—Examination of Children, 1927.

Einhorn—Duodenal Tube, 1926.

Assn. for research in nervous and mental diseases.—The Human Cerebrospinal Fluid, 1926.

Cushing—Studies in Intracranial Physiology and Surgery, 1926.

Graham—General Surgery, 1926.

Rieux—La Tuberculose Pulmonaire Latente, 1926.

Fenton—Shell Shock and its Aftermath, 1926.

Fitch—Mineral Waters of the U. S. and American Spas., 1927.

Perry—Manual of preliminary dietetics, 1926.

Bishop and Nielson—History of Cardiology, 1927.

A. M. A.—New and non-official remedies, 1927.

A. M. A.—Council on Pharmacy and Chemistry. Annual Reprint of Reports, 1926.

A. M. A.—Council on Pharmacy and Chemistry. Investigations of the Therapeutic Research Committee, 1926.

Amer. Pediatric Society Transactions, v. 35, 1923.

Philadelphia—College of Physicians, v. 48, 1926.

Rockefeller Foundation—Methods and Problems of Education, v. 7, 1927.

Carnegie Foundation for advancement of teaching—Dental Education in U. S. & Canada, 1927.

U. S. Army—Medical Department in World War—Surgery, v. 11, pt. 1, 1927.

SEALE HARRIS CLINIC.

The Seale Harris Clinic announces to the medical profession of Birmingham that Seale Harris, Jr., B.S., M. D. (Johns Hopkins '26), has been appointed resident physician to the Gorgas Hospital.

The Gorgas Hospital has been accepted unqualifiedly as a Class A hospital by the American College of Surgeons. The physician who inspected it said: "The standards of the Gorgas Hospital are far above the requirements of the College of Surgeons." The Gorgas Hospital has also been passed upon favorably by the American Medical Association as "an approved hospital for internship." An interne will be appointed later.

PREPARED MEDICINES.

The United States is the world's largest producer, consumer and exporter of prepared medicines, a report issued today by the Commerce Department's Chemical Division reveals. According to the last census the value of patent medicines and druggists' preparations manufactured in this country in 1925 was nearly $320,000,000. During the same period our exports of this class of commodity had a value of nearly $20,000,000.

There is no country, the report states, where the American drug salesman has not penetrated, and the rapidly increasing volume of our export trade indicates that his efforts have been fruitful of results. The United States has only three competitors in the international trade in prepared medicines—the United Kingdom, France and Germany. In 1925 British exports were 66 per cent of those of the United States; French exports were about 60 per cent while German shipments amounted to approximately one-half.

French exports of medicines and pharmaceuticals are distributed throughout the world and enjoy no distinct advantage in any particular region. Germany is the chief supplier of prepared medicines to continental markets, her largest business being with contiguous countries.

LOUISIANA STATE MEDICAL SOCIETY NEWS

H. Theodore Simon, M. D., Associate Editor.

DR. PERCIVAL BUTLER McCUTCHEON.

Dr. P. B. McCutcheon, a member of the State Board of Health and Honorary Vice President of the Board during the strenuous Yellow Fever seasons of the late nineties, died May 12th, at his home in New Orleans, after a long illness, leaving to his family the heritage of a name honored by a lifetime of good citizenship and unswerving devotion to duty, both in his profession and to the public. He was born at Pass Christian, Miss., February 7th, 1852, so that he was just a little more than seventy-five years old at the time of his death. He was a graduate of the Virginia Military Institute, where he served as Assistant Professor of Latin, coming later to New Orleans to take up the study of Medicine. He was a Resident Student of the Charity Hospital and received his degree as Doctor of Medicine in the Medical Department of the State University in 1879, in which institution he served a number of years as Assistant Demonstrator of Anatomy.

With the creation by Congress of the National Board of Health, represented in New Orleans by Drs. S. M. Bemiss and Stanford E. Chaille, Dr. McCutcheon was personally chosen as one of the Federal Sanitary Inspectors, a position of great responsibility on account of the friction then existing between the local Health Authorities and those of certain interior States, and one which he filled with tact and ability from 1879 to 1883.

Dr. McCutcheon was one of the most earnest and faithful coadjutors of certain other leading physicians of Louisiana in maintaining the State Medical Society, a body of men devoted to upholding the highest ideals of the profession, and during a number of years his untiring efforts in the capacity of Secretary of that organization undoubtedly kept it alive when otherwise it might have expired through sheer indifference of the profession at large. That was in the days antedating the work of the American Medical Association.

When the State Board of Health was reorganized under Act 192 of 1898 it became necessary to select two other New Orleans physicians to serve under Dr. Edmond Souchon, named by the Governor as President, and in view of conditions then existing, it was a signal mark of distinction that Dr. McCutcheon, with Dr. Arthur Nolte, were the two men chosen for that responsible and thankless service, entirely without emolument and constantly exposed to hostile criticism. It was also a mark of distinction that Dr. McCutcheon was honored by his colleagues by being made honorary Vice President of the Board, in which capacity he had to deal with an emergency arising from the report of a case suspected of being Yellow Fever, but fortunately in error, during the absence of the President.

Although a very busy physician, Dr. McCutcheon found time to devote to his full share of benevolent work in the city of New Orleans. He was physician to the Protestant Episcopal Home on Jackson Avenue for forty years, and to the Waldo Burton Memorial Home for thirty years. During the time that the public Clinic of the Orleans Anti-Tuberculosis League was located on Tulane Avenue near Elk Place, Dr. McCutcheon served quite a while as one of the volunteer staff of Examiners, doing faithful and efficient service in that great humanitarian work, with its resulting saving of human lives.

Dr. McCutcheon was identified in religious association with Trinity Episcopal Church, in which his wife, who was Miss Annie Salkeld Davis, was an active worker. She and their grown children, two sons and a daughter, survive him. The doctor was, perhaps, not as well known to the younger generation of physicians as to those of his fellow workers whose numbers are being called from time to time with distressing frequency in recent years, but his name will long be a household word among the people of the Garden District, so many of whom he helped to bring into the world, and to the poor of the city who never called on him in vain for help in time of need, and especially to the orphans who grew up in the asylums so faithfully attended by him.

REPORT OF COMMITTEE ON HOSPITALS.

To the Chairman and Members,
House of Delegates, 1927,
Louisiana State Medical Society.

Gentlemen:

In addition to some correspondence between the members and the Chairman of the Committee on Hospitals, a meeting was held, with a quorum present, at which various topics pertaining to hospitals were discussed. As a result, it was decided to present a report in the form of resolutions which are submitted for your consideration and final action.

"Whereas Act No. 62 was passed by the legislature of 1926 with the view of diminishing the

abuse of the services of the New Orleans and the Shreveport Charity Hospitals and of limiting said services, apart from emergencies, to the worthy poor, which legislation had been endorsed by this society,

Be it resolved that the action of the legislature be heartily commended and that the authorities of the New Orleans and the Shreveport Charity Hospitals be urged to do all in their power to enforce the provisions of the law both in their letter and their spirit.

Be it further resolved that all the other hospitals in the State having free or charity departments be requested to adopt an analogous course which would follow the spirit of the law."

"Whereas the latest list of hospitals of fifty beds and over published by the American College of Surgeons shows that 19 such hospitals have been approved out of a possible 23 in Louisiana.

Be it resolved that, while this society feels gratified at the showing made by the hospitals of the state, the few remaining as not yet approved be requested and encouraged to attain the minimum standard in order that the State of Louisiana may show 100% of approval for its hospitals."

"Whereas persons are sent frequently to the various hospitals without any history or data concerning their case and such information would often be of great value, especially for the patient's own sake, to the attending physician on the staff,

Be it resolved, that this society suggests to the physicians of the state the advisability of sending with the patient all the data available on the case,

Be it further resolved that the hospitals be requested, in return, to inform the doctor having referred that patient as to what was done and as to any further treatment that may be indicated."

Respectfully submitted,

Chas. Chassaignac, Chairman,
J. L. Scales,
A. J. Comeaux.

INTER-STATE POST GRADUATE ASSEMBLY OF NORTH AMERICA.

We have received a program of the next meeting of this organization, to be held in Kansas City, Mo., October 17-20, 1927. One is greatly impressed with the amount of material to be covered in the manuscripts that are to be presented during this three-day meeting, and by the prestige and reputation of the men whose names appear on the program. Undoubtedly this is to be a wonderful scientific assembly. Many foreigners are included on the program, from Germany, Italy, Belgium, Canada, England, etc. The days are to be full ones, as outlined, with sessions beginning at 7 a. m., 1 p. m., and 7 p. m. All branches of medicine are included. Certainly this should be an extremely profitable meeting for any of us who are able to get away at that time. Dr. G. W. Crile of Cleveland is in charge of the program, and states that pre-assembly clinics will be held on October 14 and 15 as well. The program has been posted on the bulletin board in the office, 1551 Canal Street.

CLINICAL CONGRESS OF PHYSICAL THERAPY AND SIXTH ANNUAL MEETING AMERICAN COLLEGE OF PHYSICAL THERAPY.

The American College of Physical Therapy announces that plans have been completed for its 1927 Clinical Congress of Physical Therapy and 6th Annual Meeting, to be held at the Hotel Sherman, Chicago, October 31st to November 5th.

The program is extraordinary in character. The first three days are to be devoted to a school of instruction. For this purpose the country's most prominent clinicians and teachers have been selected and intensive fundamental and clinical training will be given. There will be one day of sectional meetings, the following distinct sections being represented: (1) Medicine, Diagnosis, Pediatrics and Endocrinology; (2) Surgery, Gynecology, Urology, Orthopedics; (3) Eye, Ear, Nose, Throat, Oral Surgery.

The fifth day of the Congress will be devoted to a Joint Session. Numerous special addresses by some of the foremost leaders in medicine will be offered. These will be of general interest to all whether in one specialty or another. The closing day will be given over to hospital and dispensary clinics.

Inasmuch as physical therapy has made such rapid strides in the past few years, a gathering such as this is of vital interest to every practitioner and specialist. The program in itself is attractive but additional features in scientific and commercial exhibits, demonstration clinics, small group conferences, etc., will help to make this congress an unusual event.

Physicians in good standing in their county societies are eligible to attend as are also technicians and doctor's assistants properly vouched for.

Those contemplating attendance are urged to enroll by mail as early as possible. The fee for the instruction classes is $10.00 payable by all whether fellows of the college or not. Non-fellows of the college must pay in addition a registration fee to the assembly of $5.00. Send for program and information to Chairman, Convention Committee.

American College of Physical Therapy,
Suite 820, 30 N. Michigan Ave.,
Chicago.

164,002 PHYSICIANS IN NEW AMERICAN MEDICAL DIRECTORY.

For more than twenty years the American Medical Association has been publishing a directory of the medical profession. Ten editions have appeared, the last one (1927) being just off the press.

The first edition (1906) contained 128,171 names of physicians in the United States, its dependencies and Canada. The new Tenth Edition includes 164,002 names. There is an increase of 2,644 over the previous edition. If the Directory were merely a list of names and addresses of physicians it would not have great significance. That information is valuable, but of far greater value is the fact that the Directory gives proof of the right of each physician listed to practice medicine—namely, time and place of graduation and year of license. In addition, society membership, specialty and office hours are included. Capital letters indicate those who are members of their county medical society, and a special symbol follows the names of those who are Fellows of the American Medical Association.

The information concerning hospitals and sanitariums of the United States is another valuable and extensive feature. Descriptive data appears following the names of 7,816 hospitals and sanitariums such as type of patients handled, capacity, and name of superintendent or director.

The list of physicians in each state is preceded by a digest of the laws governing medical practice in that state; members of licensing board; state board of health; names of city, county and district health officers; officers of constituent state associations and component county and district medical societies. The book, in short, is one vast source of reliable data concerning the personnel of the medical profession and the institutions and activities closely related to it. It contains 2,575 pages and is sold for $15.00. Published by the American Medical Association, 535 North Dearborn Street, Chicago.

HISTORY OF MEDICAL PRACTICE IN THE STATE OF ILLINOIS.

The Illinois State Medical Society announces the completion of the first of two volumes of this history, which has been prepared under the supervision of its committee in commemoration of the Society's seventy-fifth anniversary. The second volume is to be ready soon.

The first volume of the work records events from the earliest available knowledge of the conditions in the Illinois county up until the year 1850. The second volume brings the narrative up to date. The material has been obtained from historic documents, personal letters, and diaries, and the addition of rare maps and old portraits is of considerable interest.

It is planned to extend the work in future years, so to honor the men and institutions instrumental in the progress of medical thought in that great state. The edition is limited and will not be reprinted. Orders may be sent to Committee on Medical History, Illinois State Medical Society, Medical and Dental Arts Building, 185 North Wabash Avenue, Chicago, Illinois, Charles J. Whalen, M. D., Chairman.

Dr. Randolph Unsworth, after completing a two year intensive course in psychiatry at St. Elizabeth's Hospital, Washington, D. C., has returned to New Orleans to practice his specialty.

DIED: J. E. Mumford, Pleasant Hill, La.; Louisville (Ky.) Medical College, 1875; aged 74; died May 17 of angina pectoris.

MISSISSIPPI STATE MEDICAL ASSOCIATION NEWS

J. S. Ullman, M. D., Associate Editor.

The South Mississippi Charity Hospital at Laurel reports for the year 1926 treatment of 6,500 patients with 2,000 operations. Dr. R. H. Foster is superintendent and has as his assistants Drs. H. J. Mixon and T. R. Beach.

The East Mississippi Medical Society at its meeting June 16th at Newton, Missisippi, presented the following program:

"The Value of Cystoscopic Examination in Bladder Diseases"—Dr. J. T. Bailey.

"Cases That Need Early Diagnosis"—Dr. S. H. Hairston.

"Tonsils and Adenoids in Children"—Dr. A. G. Touchstone.

"Functions of the Gall-Bladder"—Dr. Leslie V. Rush.

The next meeting will be held in Meridian, August 18th.

Dr. Leslie V. Rush and Dr. Chas. G. Wright have recently located in Meridian.

The section on Eye, Ear, Nose and Throat of the Mississippi State Medical Association at the Jackson meeting adopted a resolution of sympathy for the flood victims. Dr. Montgomery was chairman of this section but was unable to be present.

The Issaquena-Sharkey-Warren County Medical Society presented the following program at the meeting in Vicksburg, July 12th:

"Intestinal Infections in Children"—Dr. O. C. Knox.

"Prognosis in Kidney Disease"—Dr. Leon S. Lippincott.

"Medical Ethics"—Dr. E. F. Howard.

Dr. Thomas R. Beech, who for the past twelve months has been resident physician at the South Mississippi Charity Hospital in Laurel, has resigned and will resume private practice in Ellisville, August 1st.

Drs. B. L. Newell of Houlka and W. F. Hand of Lumberton have been appointed resident physicians at the South Mississippi Charity Hospital.

Dr. H. J. Mixson, Assistant Superintendent of the South Mississippi Charity Hospital, is spending his vacation in Florida.

The Staff of the Vicksburg Sanitarium presented the following program at its meeting, July 11:

"Meningeal Hemorrhage in a Child"—Dr. G. M. Street.

"Catharsis in Acute Appendicitis"—Dr. A. Street.

"Epilepsy"—Dr. L. J. Clark.

"Malignant Lymphoblastoma of the Inguinal Region"—Dr. W. H. Parsons.

The Tri-County Medical Society met in Tylertown, June 14th. The program was devoted to infant feeding and infectious diarrhea in infants. Papers were presented by Drs. R. E. Sylverstein, D. T. Brock, and J. T. Brumfield.

The next meeting will be held in Brookhaven, September 13th. President John Darrington is expected to be guest of honor.

The King's Daughters Hospital at Brookhaven is standardizing and has asked for inspection. Its staff officers are: Dr. H. R. Fairfax, President; Dr. O. N. Arrington, Vice-President; Dr. R. E. Higdon, Secretary-Treasurer. Miss M. A. Brunner is Superintendent of Nurses and Miss Boones, technician, is in charge of the laboratory and x-ray.

COUNTY HEALTH OFFICERS FOR MISSISSIPPI.

County	Name	Address
Adams	Dr. W. H. Aikman	Natchez.
Alcorn	Dr. M. W. Robertson	Rienzi.
Amite	Dr. D. F. Stubblefield	Liberty.
Attala	Dr. J. W. Comfort	Kosciusko.
Benton	Dr. Frank Ferrell	Ashland.
Bolivar	Dr. R. D. Dedwylder	Cleveland.
Calhoun	Dr. Eli Powell	Vardaman.
Carroll	Dr. J. P. T. Stephens	Vaiden.
Chickasaw	Dr. J. Rice Williams	Houston.
Choctaw	Dr. J. James	Ackerman.
Claiborne	Dr. W. N. Jenkins	Port Gibson.
Clarke	Dr. J. T. Googe	Quitman.
Clay	Dr. J. C. Ellis	West Point.

Coahoma—Dr. R. R. Kirkpatrick—Clarksdale.
Copiah—Dr. W. L. Little—Wesson.
Covington—Dr. G. T. Cranford—Seminary.
DeSoto—Dr. A. L. Emerson—Hernando.
Forrest—Dr. W. D. Beacham—Hattiesburg.
Franklin—Dr. C. E. Mullins—Bude.
George—Dr. R. F. Ratcliff—Lucedale.
Greene—Dr. M. M. Magee—Avera.
Grenada—Dr. T. J. Brown—Grenada.
Hancock—Dr. C. M. Shipp—Bay St. Louis.
Harrison—Dr. Dan J. Williams—Gulfport.
*Hinds—
Holmes—Dr. B. D. Blackwelder—Lexington.
**Humphreys—
**Issaquena—
Itawamba—Dr. N. W. Nanney—Fulton.
Jackson—Dr. John M. Kittrell—Pascagoula.
Jasper—Dr. C. E. Burnham—Bay Springs.
Jefferson—Dr. W. H. H. Lewis—Fayette.
Jefferson Davis—Dr. G. C. Terrell—Prentiss.
Jones—Dr. W. B. Harrison—Laurel.
Kemper—Dr. C. T. Bell—DeKalb.
Lafayette—Dr. E. S. Bramlette—Oxford.
Lamar—Dr. R. G. Lander—Purvis.
Lauderdale —Dr. W. W. Reynolds—Meridian.
Lawrence—Dr. B. S. Waller—Silver Creek.
Leake—Dr. I. A. Chadwick—Carthage.
Lee—Dr. C. St. C. Guild—Tupelo.
Leflore—Dr. C. P. Coogle—Greenwood.
Lincoln—Dr. W. H. Frizell—Brookhaven.
Lowndes—Dr. J. W. Cox—Columbus.
Madison—Dr. A. P. Durfey—Canton.
Marion—Dr. A. D. Simmons—Columbia.
Marshall—Dr. Ira B. Seale—Holly Springs.
Monroe—Dr. J. M. Ackers—Aberdeen.
Montgomery—Dr. J. O. Ringold—Winona.
Neshoba—Dr. Claude Yates—Philadelphia.
Newton—Dr. W. G. Gill—Newton.
Noxubee—Dr. J. D. Green—Brooksville.
Oktibbeha—Dr. H. L. Scales—Starkville.
Panola—Dr. G. H. Wood—Batesville.
Pearl River—Dr. J. W. Shackelford—Poplarville.
Perry—Dr. B. T. Robinson—New Augusta.
Pike—Dr. W. S. Lampton—Magnolia.
Pontotoc—Dr. R. P. Donaldson—Pontotoc.
Prentiss—Dr. W. H. Anderson—Booneville.
Quitman—Dr. A. C. Covington—Marks.
Rankin—Dr. J. B. Ainsworth—Florence.
Scott—Dr. W. C. Anderson—Forest.
Sharkey—Dr. A. K. Barrier—Rolling Fork.
Simpson—Dr. R. E. Giles—Mendenhall.
Smith—Dr. W. R. Ward—Raleigh.
Stone—Dr. S. E. Dunlap—Wiggins.
**Sunflower.
Tallahatchie—Dr. W. E. Jenkins—Charleston.
Tate—Dr. J. S. Eason—Coldwater.
Tippah—Dr. W. M. Murry—Ripley.
Tishomingo—Dr. T. P. Haney, Jr.—Iuka.
Tunica—Dr. W. H. Williams—Tunica.
Union—Dr. C. M. Roberts—New Albany.
Walthall—Dr. B. L. Crawford—Tylertown.
Warren—Dr. S. Myers—Vicksburg.
Washington—Dr. A. J. Ware—Greenville.
Wayne—Dr. O. A. Lomax—Waynesboro.
Webster—Dr. W. H. Curry—Eupora.
Wilkinson—Dr. C. E. Catchings—Woodville.
Winston—Dr. E. L. Richardson—Louisville.
Yalobusha—Dr. R. J. Criss—Coffeeville.
Yazoo—Dr. W. E. Noblin—Yazoo City.

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*Dr. J. B. Black, Director of the Hinds County health department, has accepted a position with the American Child Health Association for work in Tennessee. Dr. Black will leave on July first. Dr. C. C. Applewhite, Director of County Health Work for the Mississippi State Board of Health, will be in temporary charge until Dr. Black's successor can be selected.

**It is planned to establish full-time co-operative health departments in Humphreys, Issaquena and Sunflower counties within thirty days, at which time full-time county health officers will be selected by the Board of Health and the Board of Supervisors. The present Health Officers will serve until they are succeeded by full-time men.

The Homochitto Valley Medical Society met in Natchez, July 14th, and presented the following program:

"Post-Operative Ileus"—Dr. R. D. Sessions.

"A Case of Unusual Temperature Disturbance"—Drs. W. R. Brumfield and W. J. Grady.

"Treatment of Quinine Idiosyncrasies"—Dr. J. S. Ullman.

RESULTS OF MISSISSIPPI STATE BOARD OF HEALTH EXAMINATIONS, JUNE 21-22, 1927.

The following physicians were granted license to practice medicine in Mississippi after passing the examinations:

H. E. Austin, Meridian; S. L. Brister, Greenwood; McOyd Currie, Magee; J. F. Eckford, Starkville; J. G. Locan, Natchez; L. B. Moseley, Jackson; T. J. Parks, Brooksville; Richard H. Walker, Jr., Hattiesburg; R. B. Zeller, Yazoo City; R. J. Peterson, Greenwood; J. J. Savell, Bailey; H. T. Beacham, Hattiesburg; R. C. O'Ferrall, Jackson; Wm. F. Hand, Barth; Sam L. Hutchinson, Tupelo; Ellis C. Moore, Carthage; H. D. Robinson, Canton; Norman E. Applewhite,

Jackson; L. V. Rush, Meridian; R. B. Ray, Kosciusko.

The following physicians were granted license to practice medicine in Mississippi through reciprocal agreement with other states:

E. A. Canada, J. P. Evans, J. E. Garrison, P. M. George, H. I. Gosline, J. F. Lucas, C. H. Harrison, F. R. Maskrey, R. T. Smith, Hyman Tucker, J. W. Pafford, DeWitt Hamrick, and M. F. Atwood.

The following students in medicine were successful in passing the examinations on the first two years in medicine:

E. M. Anderson, W. E. Anderson, J. D. Biles, Jr., Geo. H. Butler, T. B. Butler, Jr., H. F. Garrison, Jr., Geo. L. Kaiser, Stirling S. McNair, F. J. Martin, W. L. Slaughter, J. D. Roberts, Jr., J. P. Ward, Geo. E. Riley, Chas. W. Emerson, M. B. Ware, H. B. Goodman, N. B. Lewis, J. W. Lipscomb, Jr., Paul Jackson, W. M. Coursey, James A. McCallum.

Dr. John A. Mead, for past year and a half connected with the Finkbein Lumber Co., of D'Lo, Miss., has returned to Logtown, Miss., where he formerly practiced and has resumed practice.

DIED: Henry Lee Crook, Jackson, Mississippi; Louisville (Ky.) Medical College, 1891; member Mississippi State Medical Association; formerly county health officer; aged 58; died May 5 at a local hospital of pulmonary embolism following a prostatectomy.

DIED: Frank T. Carmack, Iuka, Mississippi; Vanderbilt University School of Medicine, Nashville, Tennessee, 1880; member of the Missisippi State Medical Association; aged 70; died April 12, of paralysis.

DIED: Benjamin J. McCleskey, Atlanta, Mississippi (licensed Mississippi, year unknown); aged 81; died May 11 of heart disease.

DIED: Charles Clifton Wells, Darbun, Mississippi; Memphis (Tenn.) Hospital Medical College lege, 1908; aged 46; died May 8.

DIED: Nathan Lytle Clark, Meridian, Miss.; Louisville (Ky.) Medical College, 1883; formerly Professor of Theory and Practice of Medicine, Mississippi Medical College, Meridian; aged 70; died May 17, of hemorrhage, due to gastric ulcer.

MEDICAL SCHOOL AND HEALTH CENTER IN PEKING.

"In spite of disturbed conditions in China the Peking Union Medical College, a modern teaching and research center, built, equipped and maintained by the Foundation, continued its work without interruption during 1926. In the medical school there were sixty-four undergraduate students and eighty-two physicians doing advanced work. The school of nursing enrolled twenty-three pupils and twelve graduate students. Of the eighty-two teachers, forty-three were Chinese and thirty-nine were foreigners.

"The large proportion of Chinese teachers reflects a policy which was adopted when the institution was planned in 1916. The aim has always been to develop a wholly Chinese teaching staff and ultimately to transfer the college and hospital to Chinese auspices. This plan has been so consistently followed that the first step could be taken safely in the early future.

"Even now, should an emergency arise, there would be enough Chinese staff members to constitute more than a skeleton organization without any foreigners at all. The plant could be operated and the hospital kept in service. Even the instruction of students could be creditably continued in almost all departments, in a few on quite the present basis. For the hospital superintendent, the superintendent of mechanical operation, the heads of two departments, the second men in others, promising juniors in the rest, a large group of the nurses, many of the secretaries, practically all the typists, and the subodinate personnel are Chinese. A competent Chinese director for the whole institution could probably be found either from within the present staff or from a group of well-trained Chinese doctors who have had administrative experience elsewhere. A premature and hasty transfer to Chinese control would no doubt be unfortunate for the institution, but it need by no means be disastrous, provided the Chinese staff was permitted to carry on without interference from political intrigue or public disorder.

"For obvious reasons China has offered no opportunity for public health work of the kind which the Foundation is prepared to undertake. There has been no stable government with which to enter into relations. The Peking Union Medical College has, however, co-operated with the Metropolitan Police Department in creating a health center, which during 1926 had its first full year of operation. The activities have included sanitation, the gathering of vital statistics, the control of communicable diseases, and medical service through a clinic which does both curative and preventive work. Doctors, laboratory workers, sanitary inspectors, and visiting nurses have constituted the staff."—Reckefeller foundation.

BOOK REVIEWS

General Surgery: Ed. by Evarts A. Graham, A. B., M. D. (Practical Medicine Series). Year Book publishers. 1926. 726 p.

This little volume represents, briefly but fully, an abstract of all the important writings in surgical literature that were published during the year 1925. It is a very successful effort to bring to the attention of the profession, especially the general surgeon, all the improvements, inventions, discoveries, and advancements that have been made in sugery within very recent times. In several instances the writer adds a note or two to emphasize a certain subject, or present some criticism of the subject at hand.

The general plan of presentation is excellent. The general surgical subjects, such as roentgen-ray, anesthesia, asepsis, etc., are first explored and discussed. These are followed by a presentation of the latest thoughts, ideas, and experiments on the surgery of the various parts of the body. The presentation is quite systematic and the writer has made ample provisions to make it interesting. The book affords a very simple way in which the general surgeon may keep up with the latest advancements in surgery without having to read through lengthy articles.

FRANK L. LORIA, M. D.

The Human Cerebrospinal Fluid: By the Association for Research in Nervous and Mental Diseases. New York, Paul B. Hoeber, Inc. 1926. 568 p.

After reading through this text, I can only repeat what the editorial committee has written about it in the preface, "It is a complete and comprehensive survey of the human cerebrospinal fluid."

The methods used, that is, the discussion and the questioning of the author, after each of the subjects discussed, is unique and is a wonderful way to impress the subject upon the reader.

A. V. FRIEDRICHS, M. D.

History Taking and Recording: By James A. Corscaden, M. D. New York, Paul B. Hoeber, Inc. 1926. 78 p.

This book is divided into two parts:

1. The General Principles of Taking and Recording Histories.
2. A List of Terms Employed in History Taking.

I suppose that it is the intention of the author that this book should be used as a reference outline, and if that is his object, it serves an excellent purpose. The volume contains some very good suggestions and it is certainly of value to the medical reader, especially students and young practitioners. I recommend it highly.

HAROLD A. BLOOM, M. D.

Ophthalmic Year Book: Volume 2, ed. by William H. Crisp. Chicago, Ophthalmic Pub. Co. 1926. 315 p.

Most of us read too much and think too little. We disconnect our brains, open our eyes, and then read; because it is the easiest way.

There are in this country probably several hundred ophthalmologists who have by hard work trained themselves to read with their eyes and their brains at the same time. They know what they know and retain what is worth while when they read. Of these, at least twenty-five are directly or indirectly connected with the American Journal of Ophthalmology and its first cousin, the Ophthalmic Year Book. They force themselves daily into the rather arid desert of medical literature with its occasional oasis of new thought to gather the few worth while ideas which must be reassembled to be palatable and helpful for you and me.

Volume 23 is a worthy member of the family. Better than any other publication, it tells you what is being done in the entire ophthalmic world. It represents the greatest value in our specialty.

No ophthalmologist can give patients the best chance to get well without knowing what others are doing under similar conditions. The most practical way of accomplishing this is to read the Ophthalmic Year Book and refer to it often.

Abstracts help us gain a better general knowledge of progress in any field, tell us the source of technical and specific information if desired, and above all, aid us in the better understanding of the individual patient, thus facilitating recovery. If the abstracts were about twice their present length these fundamentals would be more easily accomplished as compared with the longer though less accurate abstracts in the German Centralblatt. The additional cost would be more than justified by the increased usefulness and value.

The chapter on Retina was not written this year by Dr. Feingold. From a sentimental standpoint, that made a big difference to me.

We owe the men who created and who perpetuate the Year Book a debt of gratitude.

CHARLES A. BAHN, M. D.

Birth Injuries of the Central Nervous System: By Frank R. Ford, Bronson Crothers and Marian C. Putnam. Baltimore, Williams & Wilkins Co. 1927. 164 p. (Medicine Monographs.)

The book is in two parts, the first part written by Ford on cerebral birth injuries and the second part by Crothers & Bronson on spinal cord birth injuries. Ford, in his introduction, states that substantial agreement has been reached by most authorities on the immediate effects of cerebral birth injury but that there is little exact information on the late results; and that all types of congenital paralysis, athetosis, epilepsy, amentia and even hydrocephalus have been attributed to birth trauma, often without the slightest evidence. The purpose of his paper is, he states, to attempt a more exact definition of the group of true cerebral birth injuries. His studies were made of cases from the pediatric and obstetrical records of Johns Hopkins Hospital. He gives a comprehensive review of the work that has been done for birth injuries. He discusses the pathological anatomy of birth injuries; the cause of injury; the results of cerebral injury; the relation of injury to spastic paralyses, to hydrocephalus, to epilepesy, and to mental defect. From his studies he draws the following "tentative" conclusions:

1st. Congenital diplegias are not to be attributed to meningeal hemorrhage at birth but are the result of various pathological processes of intra-uterine life.

2nd. Cerebral birth injuries are rare rather than common and the great mass of infantile palsies can no longer be lightly attributed to faulty obstetrical procedures.

3rd. No final statement can be made about the relation of intracranial birth injury and chronic hydrocephalus.

4th. The common diffuse meningeal hemorrhage which is not large enough to cause death apparently leaves no residuum in the majority of cases. The real birth injuries to the brain are caused by the rarer intracerebral hemorrhages, by depressed fracture, by some encapsulated meningeal hematoma.

5th. That the true cerebral birth palsies are represented by congenital hemiplegias, the monoplegias and the unequal bilateral spastic paralysis. This would mean that about six per cent of all infantile cerebral palsies are due to birth injuries.

6th. About two or three per cent of all epilepsies are due to birth injury. Severe grades of mental defect are probably not related to birth injury with the exception of that type which develops with frequent convulsions.

In part two of this book Crothers and Putnam report twenty-eight cases of birth injuries of the spinal cord with comments on each case. They then give a brief summary of the articles that have been published on this subject. They state that a study of the literature and a review of their own cases lead to the definite conclusion that most of the cases reported are due to the imposition of the unphysiological force of traction. They suggest that an important source of disability might be avoided if obstetrical text books laid stress upon the danger of traction in delivering the infant.

RENA CRAWFORD, M. D.

Clinical Neurology: Largely based upon the book by Prof. Dr. Hans Curschmann: By Edward A. Strecker, A. M., M. D., and Milton K. Meyers, B. S., LL.B., M. D. Philadelphia, P. Blakiston's Son & Co. 1927. 410 p.

The authors, who have largely followed the book by Professor Curschmann, state in their foreword that they have attempted to give a short, concise work which could be readily referred to by the busy general practitioner or by the student. In this object they have admirably succeeded.

The description of the cases are short, concise and well arranged. Their method of giving a paragraph at the beginning of each condition, with a short synopsis of the cardinal points to be looked for, will make it most convenient for the men who are checking on particular cases.

It would seem in some instances that more detail would be desirable, but on the whole the book is well written and gives sufficient to serve as a guide for further reference and study of a case, and would be an addition to the library of the neurologist as well as the general practitioner. It would seem to the writer that a book of this sort is timely and should be a great boon to those physicians who are making an effort to give their patients the best that is in them, and it should stimulate to a considerable extent the interest in neurological conditions, which is so often lacking, and should prevent their being dismissed with a shrug.

E. MCC. CONNELY, M.D.

Shell Shock and Its Aftermath: By Norman Fenton, Ph.D. St. Louis, C. V. Mosby Co. 1926. 173 p.

Shell shock is a term not American, borrowed from a neighbor, much perverted, misunderstood and its interpretation is confusing. The title of the book would read much better were it of

the "War Neuroses" rather than the title assigned to it. The consensus of opinion in the neuropsychiatric world during the War was that the term "Shell Shock" should not be used in its strictest meaning. In fact, in some Conferences it was "taboo".

The book is well written, containing much statistical data and shows painstaking research which will be more valuable in the next twenty years than it is at present for the peak of neuropsychiatric reaction in our ex-service men has not yet been reached.

The data is chronological and sequential with minute description of the workings of Base Hospital No. 117—the only hospital assigned in the A. E. F. for War Neuroses. The reviewer of this book is well acquainted with the work done at that hospital having been on duty there during the War.

A description of the treatment of cases should be used as a text by physicians who have not the time to delve into neuropsychiatric fields, as an aid in helping their own patients. The post-war follow-up method of these neuropsychiatric cases by the author is a work most essential to mental health. This system is also being followed in the U. S. Veterans' Bureau in their Regional Office and as the reviewer of this article is also connected with the Veterans' Bureau in the Neuropsychiatric Division, it is interesting to note in going through folders the result of treatment of some patients as related to whether they had been treated by neuropsychiatrists who were intensively or extensively trained,—that is whether the cases had been badly handled, so to speak, from their onset, later filtering through the various hospitals then to Base Hospital No. 117 with continued hospital excursions to discharge and later becoming problems for the U. S. Veterans Bureau to handle.

The foreword by Dr. Thomas W. Salmon is a comprehensive descriptive abstract. The book should be quite an aid to students of social psychology, normal as well as abnormal, likewise to those who had the good fortune to be assigned to Base Hospital No. 117 during its existence.

WALTER J. OTIS, M. D.

History of Cardiology: By Louis Faugeres Bishop, M. D., Sc.D., F. A. C. P., and John Neilson, Jr., B. S., M. D. New York, Medical Life Pr. 1927. 71 p.

This is a delightful, concise monograph. The history is divided into three periods, namely,—"Prescientific period," The period of scientific investigation," and "The period of scientific application." Under each heading outstanding figures and opinions are dealt with in an interesting and entertaining manner. In the concluding pages, a brief summary of modern conceptions and aspects of cardiology are discussed.

I. L. ROBBINS, M. D.

A Manual in Preliminary Dietetics: By Maude A. Perry, B.Sc. St Louis, C. V. Mosby Company. 1926. 146 p.

This book, though small, is filled with many interesting facts and practical suggestions and numerous recipes. It is a useful book.

I. L. ROBBINS, M. D.

Mineral Waters of the United States and American Spas: By William Edward Fitch, M. D. Philadelphia and New York, Lea & Febiger. 1927. 799 p.

There has been a great need of a book which will deal with the subject of hydrology and hydrotherapeutics in the United States. This has not been done adequately either in reference to the various forms of treatment by water applied externally, nor in reference to medical waters is there anywhere an accurate book concerning the various mineral springs throughout the United States.

This book will give, and does give, a tremendous amount of information to those who are interested in the subject of treatment by baths, and the treatment of disease with naturally medicated waters. The tremendous spas of Europe are indicative of the value elsewhere attached to the treatment of many diseases and disorders with mineral waters. There are few such spas in this country. The total of them does not begin to measure up to the large number in Europe. It is hoped that this book will stimulate a valuable form of treatment, which has been in the past frequently disregarded, where it might have been of great assistance.

J. H. MUSSER, M. D.

La Tuberculose Pulmonaire Latente: By J. Rieux. Paris, Gaston Doin & Company. 1926. 247 p.

A treatise on the early symptoms and signs of tuberculosis, which endeavors to call attention to the necessity of making an early diagnosis, and to make an accurate diagnosis. The author uses the term latent tuberculosis to imply to the stage which we frequently speak of in this country as pre-tuberculous. He uses this term advisably,

and uses it in preference to pre-tuberculous, threatened tuberculosis, the suspected bronchitis and so on.

The book is divided into six chapters, the first of which deals with the various stages of pulmonary tuberculosis in man, and elaborates on just what the author means by latent tuberculosis. The second chapter deals with symptomology of the condition, the history, the physical examination, and the signs in other organs. The next chapter deals with the roentgenological evidence of latent tuberculosis, including the hilar and pleural changes upon which the author lays great stress. The fourth chapter deals with skin reactions, complement fixation and agglutination reactions. The fifth chapter discusses the several types of latent tuberculosis, as for example the hilar type. The last chapter deals with the differential diagnosis and prognosis of this particular type of tuberculosis. Following this is a series of clinical observations and case reports, while the last pages are devoted to very excellent photographic reproductions of roentgenograms of the chest of normal and diseased individuals.

The book is a sane and sensible exposition on a type of tuberculosis which is often difficult to recognize and hard to appreciate.

J. H. MUSSER, M. D.

Examination of Children by Clinical and Laboratory Methods: By Abraham Levinson, B. S., M. D. 2d edition. St. Louis, C. V. Mosby Company. 1927. 192 p.

This book represents the gist of bedside lectures; it is practical and well illustrated. The matter is carefully selected and presented in a clear way easily available to the general practitioner as well as the laboratory worker.

The author lays stress on the extreme value of simple methods of inspection and palpation, and gives good advice on how to reach the young patient to be examined. Many report-forms accompany the text, some extremely valuable.

In the estimation of the reviewer, the most salient sections of the book are the following: The chapter on roentgen-ray, which, besides being clearly illustrated, is exceedingly well arranged, and the chapter on blood and urine examination. The chapter on food tests and examination of stools could be profitably enlarged and better illustrated.

NARCISSE F. THIBERGE, M. D.

City Health Administration: By Carl E. McCombs, M. D. New York, The Macmillan Co. 1927. 524 p.

McCombs' recent publication, "City Health Administration," is a remarkably fine and complete dissertaton on the subject. The subject matter is divided among twenty-two chapters under three main divisions. Only an author with an enormous amount of material at his command could cover the many phases of the subject so thoroughly.

One is gratified to note that the author of this excellent work regards venereal disease prevention as the most vital problem, though he handles the subject rather too briefly. The same may be said of his recognition of the increasing necessity for coping with the gradual, but significant increase in the mortality from heart disease.

City Health Administration is not a book that one would select to read as a diversion. It is essentially a volume of reference based on McCombs' experience with Municipal Bureaus of Research and his own reflections; doubtless this is what he intended it should be.

OSCAR DOWLING, M. D.

Malarial Psychoses and Neuroses: By William K. Anderson, M. D., F. R. F. P. S. (Glas.). Lond., Oxford univ. pr. 1927. 395 p.

This book presents the author's experience with mental and nervous conditions supposed to have arisen from malaria, along with that of many others selected as representative examples. It will be found most interesting and instructive to students of malaria who are well informed about the nature of malaria and the great variety of symptoms it can produce, and especially the frequency of malarial infection associated with other diseases, in regions where it is prevalent.

On the other hand, those who know little about malaria and accept the observations and opinions without reservation are likely to be misled by the tendency on the part of the author and of many others whose observations are quoted, to attribute conditions to malaria merely because parasites are found present and improvement or recovery follows administration of quinine.

Cases of practically every known syndrome have been attributed to malaria without any convincing evidence being present that malaria, when present, was anything more than merely a complication of nervous and mental conditions which may have been due to other causes.

There are chapters on the history of malaria and on race degeneration, alcohol and surgery in relation to malaria. There are also 34 pages of references, which indicates that the author made extensive researches into the literature.

C. C. BASS, M. D.

Hospital Housekeeping and Sanitation: By Nora P. Hurst, R. N. St. Louis, C. V. Mosby Co. 1926. 155 p.

The subject is presented with the view of offering teaching material for Training School Instructors and is admirably arranged for this purpose.

The book is unique in that up to this time, Training School instructors have had to obtain their subject matter by reference to various text books and current literature on the subject. The subject matter is somewhat elementary and many authorities would perhaps disagree with methods suggested.

JOHN D. SPELMAN, M. D.

American Illustrated Medical Dictionary. 14th ed. rev. & enl. Philadelphia and London, W. B. Saunders. 1927. 1388 p.

The last two years have made necessary a new edition of this standard medical dictionary, with the addition of 2000 new words. Dr. Dorland is a member of the Committee on Nomenclature and Classification of Diseases of the American Medical Association. Special features worthy of mention are its valuable anatomic tables, chemical formulas and symbols, signs and symptom treatments, operations, dosage, tests, reactions, medical biographies and 487 illustrations, 107 of which are in color.

MARY LOUISE MARSHALL.

Chronic Rheumatic Diseases, Their Diagnosis and Treatment: By F. G. Thomson, M. A., M. D., F. R. C. P., and R. G. Gordon, M. D., D.Sc., M. R. C. P. Lond., Oxford University Press. 1926. 202 p.

This book a treatise on a group of joint diseases which is responsible for a greater percentage of our physical disabilities is written by two British physicians, the one a fellow and the other a member of the Royal College of Physicians.

The introductory after describing the appalling disabilities and loss of work hours makes a plea for more correct diagnosis and better treatment of the acute joint conditions so as to curtail their development into the chronic stages.

The book is divided into three parts. The first dealing with the etiology of chronic joint diseases and a description of each type. The second part treats the question of differential diagnosis and the third presents treatment. The section on treatment is quite complete, and in the order drug, hydrology, climatic, physiotherapy, orthopedic, vaccine and dietary treatment is fully discussed.

While there is nothing new or original in any of its phases, it would well be worth the time of not only the orthopedist but the general surgeon and physician to carefully peruse this work.

H. THEODORE SIMON, M. D.

The Health of the Child of School Age: By Various Authors; with a foreward by Sir Thomas Oliver, M. A., M. D., F. R. C. P., LL.D., D. C. L. Lond., Oxford univ. pr. 1927. 204 p.

A series of ten lectures on various disorders of childhood and how properly to take care of them. It is written for the use of parents and teachers by men well known in the medical profession and therefore able to bring to bear upon the theme of their addresses, expert knowledge of the subject.

JOHN H. MUSSER, M. D.

PUBLICATIONS RECEIVED.

W. B. Saunders Company, Philadelphia and London: "A Text-Book of Medicine," by American authors, edited by Russell L. Cecil, A. B., M. D. "Collected Papers of the Mayo Clinic and the Mayo Foundation," Volume XVIII, 1926. "Text-Book of Bacteriology," by William W. Ford, M. D. "A Text-Book of Pathology," by Alfred Stengel, M. D., Sc. D., and Herbert Fox, M. D. "The American Illustrated Medical Dictionary," by W. A. Newman Dorland, A. M., M. D., F. A. C. S.

Paul B. Hoeber, Inc., New York: "Practical Lectures," second series, 1924-1926. "Pioneer Medicine in Western Pennsylvania," by Theodore Diller, M. D. "Hernia and Hernioplasty," by Ernest M. Cowell, D. S. O., M. D., B. S.

Physicians and Surgeons Book Co., Brooklyn, N. Y.: "Disorders of the Nose, Throat and Ear, problems of Deafness," by Aaron Roth, M. D., F. A. C. S.

The MacMillan Company, New York: "The Cause and Cure of Speech Disorders," by James Sonnett Greene, M. D., and Emilie J. Wells, B. A.

The C. V. Mosby Company, St. Louis: "Heart and Athletics," by Felix Deutsch, M. D., and Emil Kauf, M. D.

The Williams & Wilkins Company, Baltimore: "Evolution of Preventive Medicine," by Sir Arthur Newsholme, K. C. B., M. D., F. R. C. P. "Anatomical, Phylogenetical and Clinical Studies on the Central Nervous System," by B. Brouwer.

J. B. Lippincott Company, Philadelphia and London: "International Clinics," Volume II, Thirty-Seventh Series, 1927. "Lippencott's Pocket Formulary," by George E. Rehberger, M. D.

REPRINT.

"Essai de Dynamometrie Humaine et D'Evaluation du Tonus Musculaire," by Dr. Gabriel Bidou.